Avtron ADDAPT 98

ADDvantage-32 Application Programming Tools

Part Number 682110 (CD ROM)

Version 14, 15, and 16

USER'S MANUAL

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Feb. 1995

August 3, 2001

IMPORTANT USER INFORMATION

PRODUCT EXCEPTION LIST

Avtron ADDAPT 98 Version 14, 15, and 16

The following list describes problems that may be encountered when using this product, along with remedies available at this time. These issues are currently being addressed, and pertain only to the above version of software. If more information is required, contact the Avtron Field Service Department at 216-642-1230.

1. Selecting Reset Drive during run will not reset the drive as would be expected; however, no notice or error message is given. Also, note that a Configuration window must be open to perform Reset from Tools while not in run.

2. On the Signal Analyzer, the PgUp, PgDn, and arrow keys may not function as described.

3. While changing Y or P parameters, the Up/Down/PgUp/PgDn arrow keys cannot be used to scroll within the drop down selection box. They will move the selection, but the next selection is immediately entered.

4. Changes in the units for A088, A216, C088, and C216 may need to be entered manually at the drive if you are using a serial link.

5. Right clicking an online minimized Realtime screen on the taskbar may cause Realtime to shut down.

6. When using "Save As" from a Configuration screen, you must ensure that no newly entered data is red (not saved) by clicking on another row.

7. When entering new sections in the Configuration screen, complete each row before continuing to the next section.

8. The "Find Next" and "Replace" functions may not operate correctly in some circumstances.

9. The communication LED located at the bottom of the window may not show communication status properly even though the "Activity LED" is selected from the "View" menu bar.

10. If installing on a drive other than C: you must change the default directories under Tools-Options to match the correct path.

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SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual provides instructions for using Avtron's ADDvantage-32 Application Programming Tools (ADDAPT™).

This is a Windows 98 based version of ADDAPT, a program suite used to support Avtron digital drive systems.

1.2 DESCRIPTION

The ADDAPT software package allows a PC to communicate with all drives on the system. ADDAPT can simplify setup and tuning, display real-time operating screens and fault FIFO information, and provide diagnostics superior to any other drive control system. The ADDAPT program suite is a fully scalable and extensible product.

Features of the ADDAPT version include the following:

- PC access to drive system calibration and configuration data allows for online/offline data editing functions, uploading and downloading parameter data to the drives, file storage and file retrieval.
- Access to fault FIFO data enables the user to view any drives FIFO in real time as well as allowing the user to clear fault FIFO or perform a fault reset of the drive.
- Signal Analysis Tools (SAT) allows the user to analyze previously saved datasets in a graphic format.

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- The Real Time Data Screen allows real time viewing and editing of user defined data in a tabular format.

- Layered security system lets different level users log on with access to more or fewer features (see following).

A convenient, layered security system used when logging on provides four access levels as follows:

Observer	Lowest Level
Operator	|
Maintenance	|
Engineer	Highest Level

The system allows lower level users, e.g., an "observer", to use basic features, while higher level users and administrators use a password to gain more powerful access. The defaults, capabilities, etc., are set up by a user with an “Engineer” level. When using the security system, it is essential that the first user be established as “Engineer.”

Appendix B provides instructions, intended for appropriate personnel, that cover the layered security system. This appendix may be removed for filing at a separate location, if desired.

It is recommended that you read and understand the contents of this manual to fully benefit from all the available features.

1.3 SCOPE

Section II tells how to configure the system. Section III, "ADDAPT BASICS", describes how to start the program, how to logout, and how to use the various Windows tools, menus, and commands in the ADDAPT program. Section IV, "MAINTENANCE PROGRAM", covers using ADDAPT to download and upload parameter data to the drives, as well as saving, editing, and retrieving parameter data to and from disk files. Remaining sections explain the use of the Fault FIFO Viewer, accessing the Signal Analysis Tools (SAT), and using the Real Time Data Collection tool.

Installation information is normally not required since ADDAPT is provided fully installed on the Avtron ADDvantage-32 system computer. However, installation instructions are given in Appendix A at the back of this manual, should they be needed.

As mentioned, Appendix B has more information on setting up the security system.

1.4 SUPPLEMENTAL INFORMATION

This manual is intended to be used in conjunction with other Avtron ADDvantage-32 digital drive system manuals supplied with your system.

1.5 PLATFORM REQUIREMENTS

Minimum hardware requirements are a reasonable system to run Windows 98, including:

- Windows 98® operating system
- 586 DX 266 MHZ (or better)
- 64 Mbytes of RAM minimum, 128 Mbytes recommended
- 25 Mbytes free hard disk
- VGA color monitor with screen resolution of 800 x 600 pixels, minimum
- Mouse or equivalent device
- One or more available COM ports if running the Serial Link option of ADDAPT
- Avtron part number 630290 communication co-processor if using the LAN option of ADDAPT, and an available ISA slot

Failure to provide the minimum hardware will result in poor software performance, including lock-ups and sporadic errors.

SECTION II

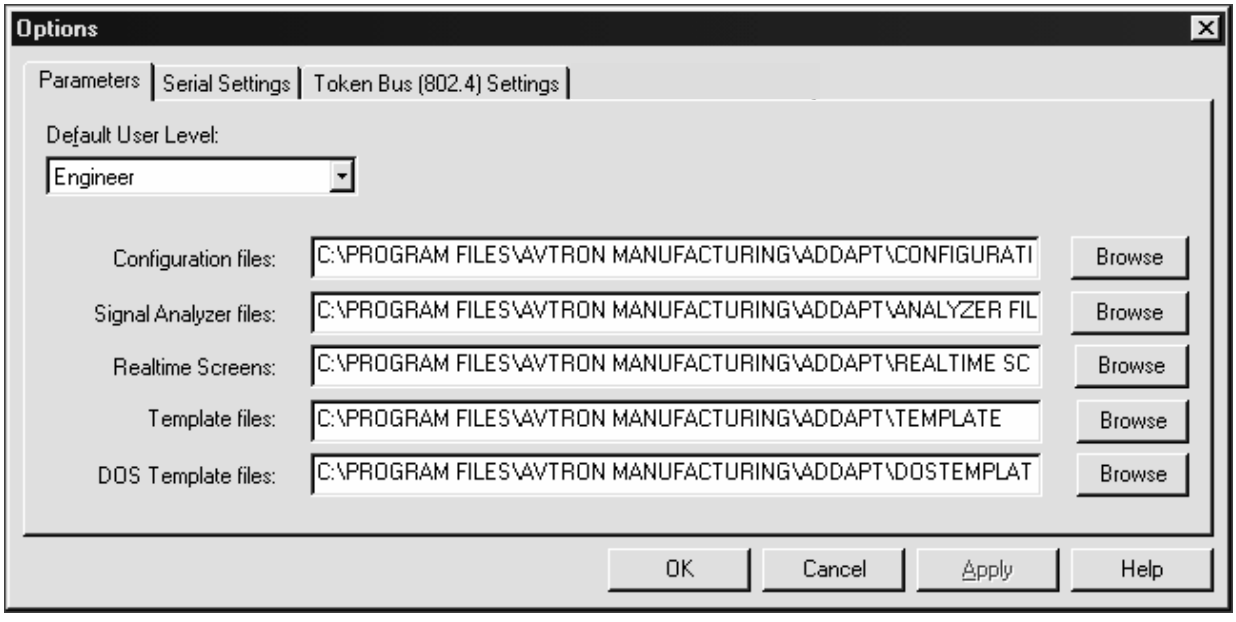
CONFIGURATION

2.1 INTRODUCTION

This section tells how to configure various features of the ADDAPT program and the drives. In general, a user must have a maintenance or higher access level to change these setups. If no reconfiguration is required, proceed to Section III.

2.2 SYSTEM DEFAULT SETTINGS

The Parameters window (Figure 2-1) is obtained by selecting ***Options*** under Tools. The Parameters tab is selected by default. It allows viewing and editing of default directory names where various files will be saved. These default file directories may be viewed or set by typing in the desired directory or using the browse button. A drop-down list permits choosing the Default User Level. Click OK or Cancel to return to the main screen.



WINADB1LAN

Figure 2-1. Default Directories Dialog Box

Template files are created during auto-configure and conversion of DOS template files. The template file directory would only be used during troubleshooting. All DOS template and

DOS Cal/Config files that a user wishes to convert to Windows files should be copied to the DOS template directory. Cal/Cfg files created by ADDAPT are stored in the configuration directory. These ".add" files contain drive configuration data.

TABLE 2-1. FILE NAMES AND TYPES

TYPE OF FILE	FILENAME FORMAT
System Configuration File	filename.cfg
Windows Drive Cal/Cfg File	filename.add
Windows Base Cal/Cfg File where 69xxxx is and yy	69xxxxyy.add Software Part Number Version Number
Windows Template File where 69xxxx is and yy	69xxxxyy.tem Software Part Number Version Number
DOS Drive Cal/Cfg File where yy is and x is When converted to Windows files, all these files are combined into one Drive Cal/Cfg file (.add).	filename.xyy Configuration File Index -1 single letter for data group g - Drive Cal Data h - Drive Config Data i - Calibration Data j - Configuration Data q - Cal Table Data r - Analog Patch Board Units s - Calibration Units
DOS Template File where 69xxxx is and yy is and z is When converted to Windows files, all these files are combined into one Template file (.tem).	69xxxxyy.z Software part number version number single letter extension for data group a - Analog Patch Board b - Digital Patch Board c - Drive Cal Definition d - Drive Config Definition e - Cal Definition f - Config Definition k - Logic Analyzer Cal Definition l - Logic Analyzer Config Definition m - Drive Config Select List n - Cal Table Definition u - Realtime Template

2.3 DRIVE COMMUNICATION SETUP

The ADDAPT program communicates with all drives via one or more device drivers. Each device driver has a set of properties that defines its configuration and operation. ADDAPT supports two device driver types: the RS485 serial link and the 802.4 LAN. Multiple drivers can co-exist in one system. Figure 2-2a shows the Serial Settings dialog box. Figure 2-2b shows the LAN Settings dialog box. These dialog boxes may be displayed by selecting ***Options*** in the Tools pull-down menu and then selecting the appropriate tab. These figures are examples - the properties of each driver may vary. Properties of the two types of device drivers are given in Tables 2-2a and 2-2b.

a. RS485 Serial Link

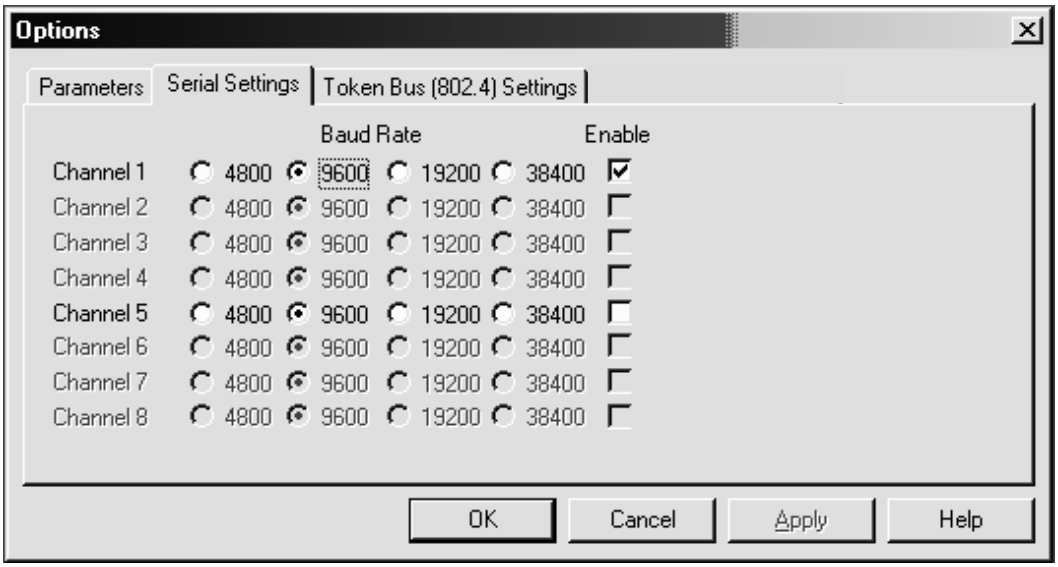


Figure 2-2a. Serial Settings Dialog Box

TABLE 2-2a. RS485 SERIAL LINK PROPERTIES

NAME	RANGE
COM PORT (Channel)	select COM PORT 1 through COM PORT 8
BAUD RATE	Match the parameters at Y003 in DC drive or Y001 in AC drive.

The RS485 Serial Link device driver communicates via the standard ADD32 DF1 protocol. It also can provide a direct serial link access to a drive to support the FLASHZAP feature, a program that downloads software into an ADD32 drive and does not follow the ADD32 protocol. When selecting the parameters for a serial link, the user will be presented with the available ports, as shown in Figure 2-2a. The selected COM PORT must be enabled in the computer's Bios setup. The baud rate chosen should match the drive parameter Y003 in DC drives and Y001 in AC drives. Note that channel numbers and com ports are synonymous for this selection.

b. 802.4 LAN

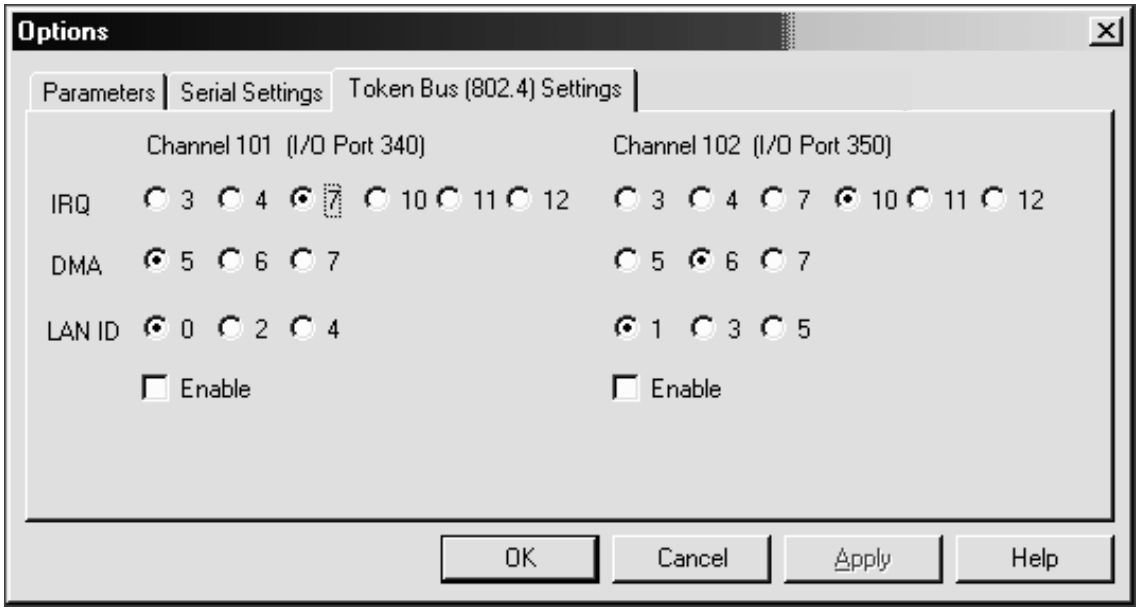


Figure 2-2b. LAN Settings Dialog Box

TABLE 2-2b. 802.4 LAN PROPERTIES

NAME	RANGE	NOTES
LAN ID	0, 1-5	The LAN property defines the ID of the communications coprocessor board (P/N 630290) installed in the computer. That is to be associated with a particular channel (101 or 102). A hardware jumper, JP1, must be installed on the 630290 coprocessor when channel 101 is chosen, and must be removed when channel 102 is chosen.
IRQ LEVEL	3, 4, 7, 10, 11, 12	The proper IRQ and DMA levels are determined by available resources in the host computer. On the computer's System Resource Report, check the appropriate Usage Summary list and determine an unused IRQ level number and an unused DMA Channel number that are also listed in the Range column of this table (Table 2-2b). The resource report may be printed out in WINDOWS 98 as follows: right click on My Computer. Then select Properties > Device Manager Tab > Print > All devices and system summary > OK.
DMA CHANNEL	5, 6, 7	

The 802.4 LAN device driver supports the standard peer-primitive communication as well as the autoscan and data exchange services. When selecting the parameters for an 802.4 LAN card, the user will be presented with a dialog box requiring IRQ, DMA, and LAN ID selection. Selecting either Channel 101 or 102 is dependent upon JP1 (see Table 2-2b). Select IRQ and DMA with numbers which do not conflict with other system drivers. 10 and 5 are usually good choices for the IRQ and DMA numbers.

The drivers perform error checking and initiate retries if errors are occurring. If communication fails, the driver reports the error and provides an indication of the problem.

Assign new drivers and/or edit existing properties by selecting parameters. Click OK or Cancel to return to the main screen.

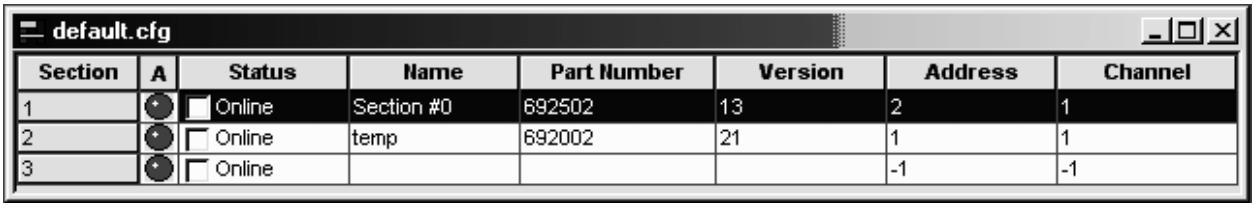
2.4 DRIVE PERSONALITY DATA

Opening a list of configured drives (File > ***Open***), e.g. filename.cfg, produces the Drive Personality Data screen shown in Figure 2-3. This hypothetical screen displays a list of configured drives ("sections"). Selecting ***Open Default Configuration*** in the File pull-down menu will directly display the most recently opened configuration list. Toolbar buttons can do these tasks also. The following information can be selected and edited (by a user having a Maintenance access level or higher): Status (online or offline), Section Name, Part Number, Version, Address, and Channel. This entered text is red until it is saved. Saving it is accomplished by simply clicking on a different section. If you fail to click outside of the row to save it, you will be prompted to save when you exit the dialog. The last section will always have an address and channel of -1, with no name, P/N, or version, signifying the end of the list. This screen also allows access to editing parameters, as discussed in paragraph 4.2.4.

ADDAPT will not allow two sections with the same name or address. Valid part numbers are from 690000 to 699999. Valid versions are 10-999. Status could be online or offline. (A circle, next to the section number, indicates communication status. The circle will be gray if the section is configured offline, blinking green if configured online and communicating, or red if configured online but a communication error exists.) "Channel" refers to the communication port being used. 1 to 8 refers to COM1 to COM8, respectively. 101 and 102 refer to the LAN card using I/O port 340 or I/O port 350, respectively.

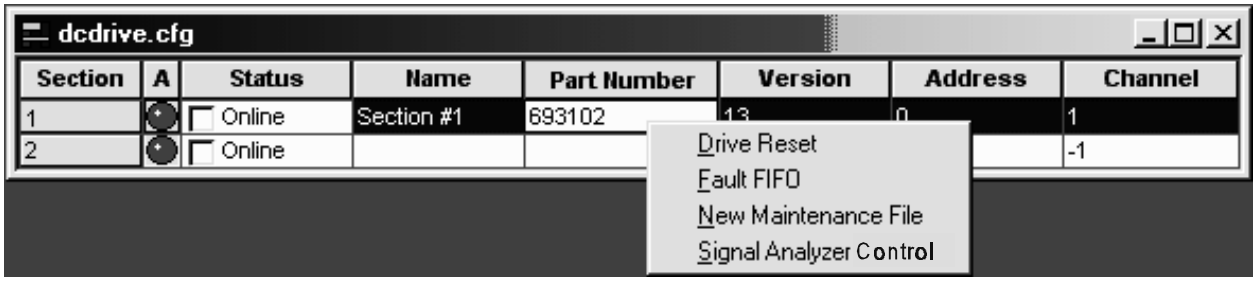
New sections may be added to the configuration list by entering valid data into the blank cells in the blank line at the bottom of the list. To delete a drive from the list, first ensure that the drive status of the drive to be deleted has no check by “Online.” Next, highlight the row of the configuration list to be deleted. Finally, press the delete key or right click the mouse and select “Delete Section”.

ADDAPT also offers the user the option of performing several functions from the configuration list. A pop-up menu will appear, as shown in Figure 2-3a, simply by right clicking on any item in the appropriate row. Available options in pop up menu will be determined by online/offline status and the user’s Security Login Level.



WINADB3LAN

Figure 2-3. Drive Personality Data Screen

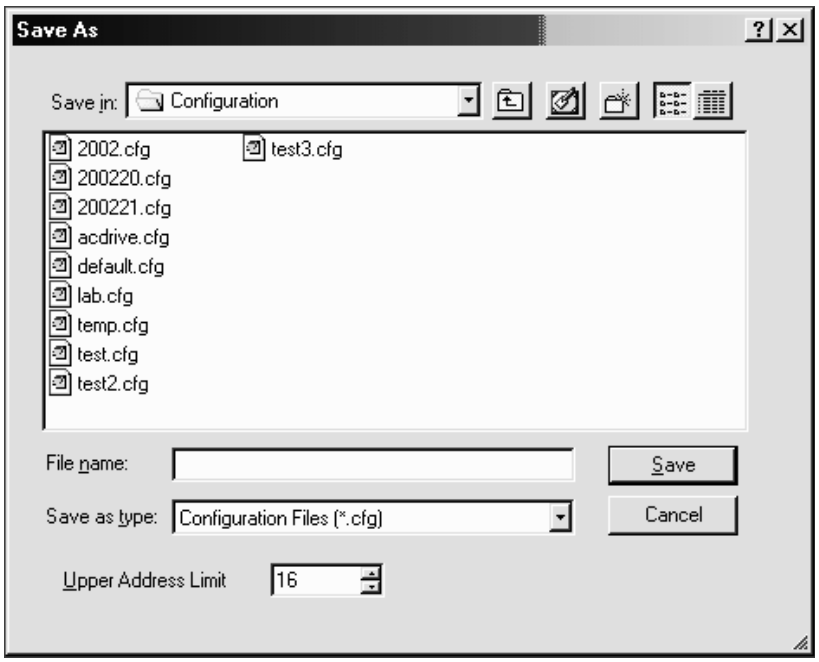


WINADB3ALAN

Figure 2-3a. Drive Personality Box Options (Online Section)

2.4.1 Auto Configure

If the computer is connected to a drive system, the user can select Auto Configure to list all connected drives. Auto-configuration enables the computer to communicate with the system and automatically sets up the configuration file. Select ***Auto Configure***, under the Tools pull-down menu, to display the dialog box shown in Figure 2-4. The program will ask for the upper address limit it should check for. After naming and upon clicking SAVE, ADDAPT will go out and query each address. If a drive is found within the address range, the program sets up its configuration with a unique drive name (e.g., "section #1"). Upon completion, the configuration file can be opened via the “Open” icon on the tool bar. Example file types are given in Table 2-1.



WINADB4LAN

Figure 2-4. Auto Configuration

Note that, prior to running Auto Configure, the communication options must be selected and the Drive Template files (paragraph 2.5) must be accounted for before the software becomes functional.

The drive personality data is persistent. The program automatically starts with the last configuration used. If sections are online, the program starts the process to communicate to them. (See next paragraph.)

2.5 DRIVE TEMPLATE FILES

The windows template file(s) (see Table 2-1) need to be loaded into the Template directory. See Figure 2-1 for the directory location configuration. Insert the drive template diskette into a floppy drive and copy all drive template files (.tem). Copy any calibration files (.add) to the Configuration directory.

In the event you need to convert old DOS template files, copy them to the DOS Template directory. Then select "DOS Conversion Utilities" from the File menu. To create a windows template file, select any one of the old DOS files and click on the "Open" button followed by the "Save" button.

2.6 DRIVE RESET

After making configuration changes, the user can activate the changes without going to the drive's keypad. After right-clicking on the drive NAME (must be an online section) in the Drive Personality screen (Figure 2-3), select ***Drive Reset***. See Figure 2-3a. This can also be accomplished with the ***Reset Drive*** command in the Tools menu, but the Drive Personality Data Screen must be active. The reset will not work if the drive is running. Only a user with a maintenance or higher level access can perform a drive reset in this manner.

Clear Faults is also available as a toolbar button, to any user. See Section V, Fault Fifo Viewer.

SECTION III

USING ADDAPT - BASIC

3.1 STARTING ADDAPT

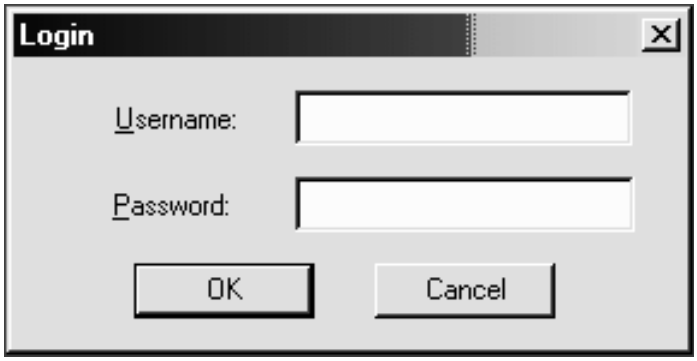
Login employs a layered security system wherein individuals can be assigned a level of access and a password. This method also allows someone without a password to use the program, but usually with very limited access capabilities. The access level when normally starting ADDAPT without logging in is, by default, "Observer" (the lowest level). However, when first using ADDAPT, up until the security system is initialized, the access level is “Engineer” (the highest level). This allows any user to perform initialization.

Any level can be assigned to be default. Avoiding passwords and user names can be very convenient, when doing field service, for example. Disabling the security system can be accomplished by an “Engineer” setting the default security level to “Engineer” (Tools > Options). The four access levels are:

Observer	Lowest Level
Operator	|
Maintenance	|
Engineer	Highest Level

See Appendix B for more information on setting up defaults and passwords in the security system.

Figure 3-1 shows the ADDAPT LOGIN screen, available in the Security pull-down menu. This dialog box is not required in order to use ADDAPT at the default level. To log in, enter your name and password (neither is case-sensitive), and select OK. You will be returned to the ADDAPT main screen (Figure 3-2) with updated status bar information.

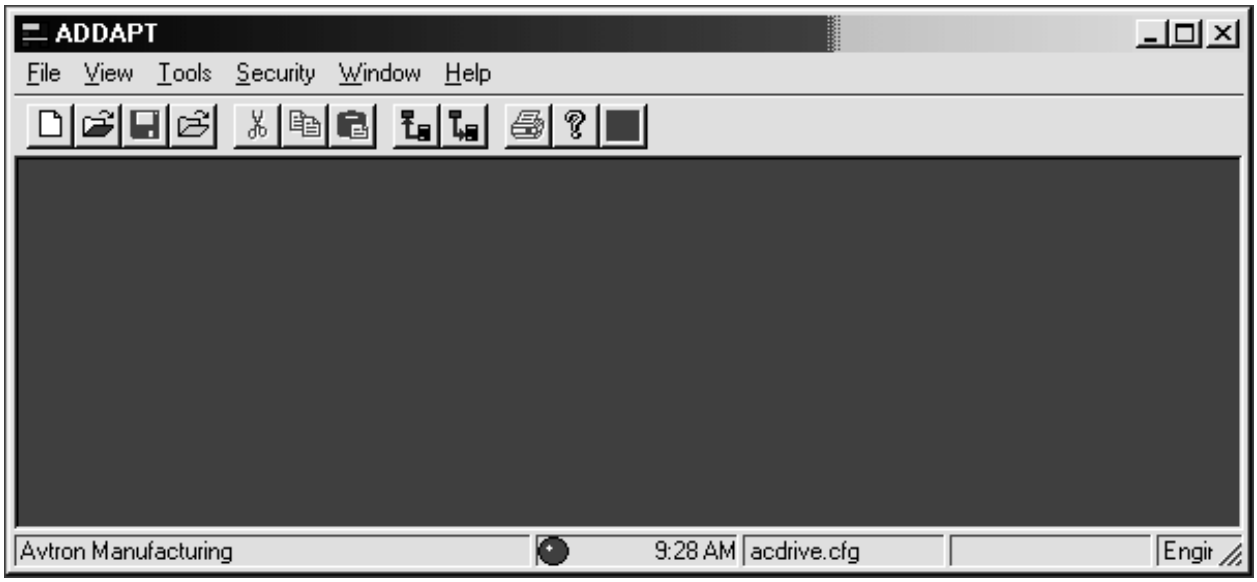


WINADC1LAN

Figure 3-1. Login Screen

3.2 PULL-DOWN MENU BAR

On top of the ADDAPT main screen (Figure 3-2) is the pull-down menu bar. The menus available are File, View, Tools, Security, Window, and Help. Other menus appear when appropriate, such as Edit when using the maintenance tools (see Section IV). Clicking on a pull-down menu displays the available selections. Many pull-down menu items are duplicated by the icons seen in the toolbar. Moving the mouse cursor over the buttons will describe the buttons' purpose. The individual menu selections are described below.



WINADC2LAN

Figure 3-2. ADDAPT Main Screen

3.2.1 File

These selections include typical windows commands, for example, to ***Open***, ***Close***, and ***Print*** files. ***Exit*** will close ADDAPT. ***Open Default Configuration*** directly displays the drive personality data screen for the most recently opened configuration file. (See paragraph 2.4.) ***Convert DOS ADDAPT File*** allows converting previously saved ADDAPT files done in DOS. See paragraph 3.5.

3.2.2 View

The ***Toolbar*** and ***Status Bar***, located near the top and bottom of the main screen, respectively, may be enabled or disabled by clicking on that name in the View pull-down menu. When the item has a check next to it, it is enabled (displayed). The toolbar and status bar are discussed in paragraphs 3.3 and 3.4 below. **Activity LED** enables the grid and status bar activity LEDs.

The commands ***Parameters*** and ***Graph*** also become available when editing parameters.

3.2.3 Tools

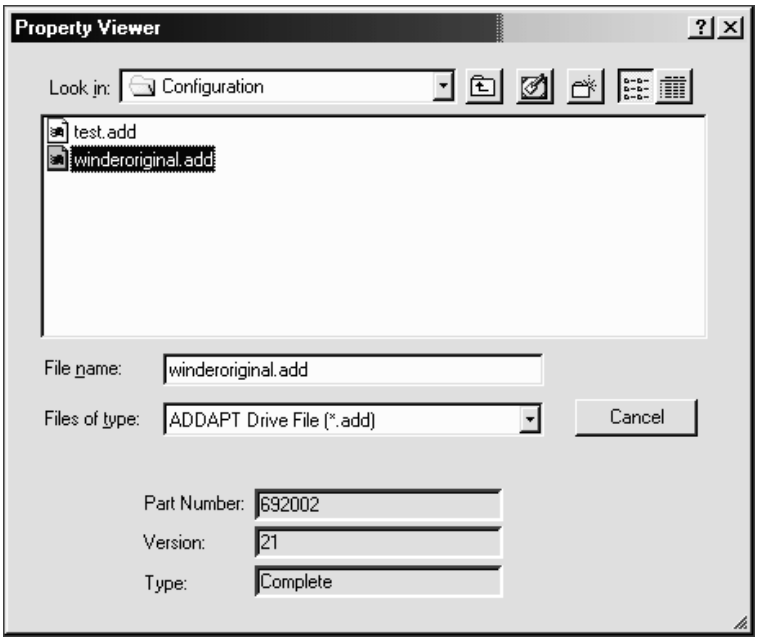
The Tools menu provides access to the ***Upload*** Data and ***Download*** Data windows. These are explained in Section IV, Maintenance Package. Other screens accessed under tools are the ***Fault Fifo*** Viewer, covered in Section V; ***Auto Configure***, discussed in paragraph 2.4; and ***Options***, which provides configuration screens explained in paragraphs 2.2 and 2.3. The ***Reset Drive*** command activates any calibration and configuration changes to an online drive, as discussed in paragraph 2.6.

Also under Tools is ***Property Viewer*** (Figure 3-3), a utility that checks and displays the properties of saved files. Files may also be deleted, by selecting the file and pressing the delete key. Information included is the filename and type, date and time saved, part and version number, and size. The only file extension available is .add. Property Viewer also indicates if an extraction file or a complete parameter file.

Selecting **Real Time Data Collection** opens that tool, which allows real time viewing and editing of user-defined data in a tabular format. See Section VIII.

The ***Signal Analyzer Control*** and ***Signal Analyzer*** (viewer) commands are discussed in Sections VI and VII.

Choosing the ***ADDAPT Maintenance File*** command from Tools is one of several ways to edit parameters. You will first get the Select Section box (Figure 4-4). Picking the desired section and clicking OK displays Figure 4-5, the Maintenance Grid, which will enable the user to edit drive parameters of the chosen section. Paragraph 4.2.5 explains how to complete the editing task using the Maintenance Grid. Editing can be online or offline.

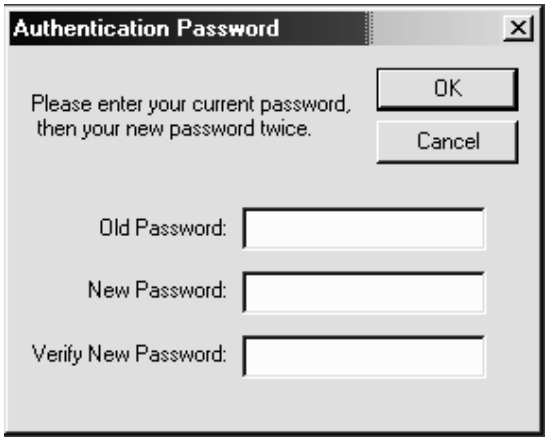


WINADC3LAN

Figure 3-3. Property Viewer

3.2.4 Security

This pull-down menu allows opening windows for ***Login***, ***Logout***, ***Change Password***, ***Security Manager***, and ***Product Code***. Login was described in paragraph 3.1. The change password screen is shown in Figure 3-4. Any level of user may change his or her own password using this window.



WINADC4LAN

Figure 3-4. Change Password Screen

The Security manager command allows a user with proper access level to create usernames and passwords, change access levels, and perform other restricted security tasks. See Appendix B for more information.

The ***Product Code*** selection is for entering the product code, which can be supplied by the Avtron Field Service Department by calling 216-642-1230, Ext. 1214. Please note the serial number displayed in the Product Code window prior to calling Avtron. This screen displays a list of options and for each option will state whether it is "Available" or "Unavailable". If available, that option will be found under the Tools pull-down menu. If a purchased option is indicated as unavailable, contact the Field Service Department for the correct product code or assistance.

3.2.5 Window

These selections -- ***New Window***, ***Cascade***, ***Tile Horizontally***, ***Tile Vertically***, and ***Arrange Icons*** -- are typical Windows commands. See Section IV for their use.

3.2.6 Help

This pull-down menu has ADDAPT release information (***About ADDAPT***) as well as online user ***Help Topics***.

3.2.7 Edit

These commands -- ***Undo***, ***Redo***, ***Cut***, ***Copy***, ***Paste***, ***Find***, ***Replace***, ***Mark All***, and ***Unmark All*** -- are available when editing parameters and are discussed in paragraphs 4.2.5.

3.3 TOOLBAR

When selected as described in paragraphs 3.2.2, the toolbar will be displayed just under the pull-down menu bar. Clicking on these buttons is a quicker way of activating some of the same comands found in the pull-down menus. Moving the mouse pointer over a button displays its function. The toolbar remains available for use when using some other ADDAPT windows.

The Tool Bar:

3.3.1 These buttons are equivalent to the ***New***, ***Open***, and ***Save*** functions usually found under a File pull-down menu. An additional tool in this group, resembling Open, is equivalent to the File > ***Open Default Configuration*** command, described in paragraph 2.4.

3.3.2 These buttons are equivalent to the ***Cut***, ***Copy***, and ***Paste*** commands usually found under an Edit pull-down menu.

3.3.3 These buttons are equivalent to the ***Upload*** and ***Download*** commands found in the Tools pull-down menu. These commands display the Upload Data and Download Data windows, which are explained in Section IV.

3.3.4 This button is equivalent to the ***Print*** function found in the File pull-down menu. Use this button to print.

3.3.5 Use this button to go directly to user online help topics.

3.3.6 Two additional buttons appear when editing parameters (paragraph 4.2.5). These are equivalent to the ***Parameters*** and ***Graph*** commands found in the View Menu. (Parameters is also accessible as "***View Parameters***", available when right clicking on a value.)

3.3.7 Two additional buttons appear when displaying the Fault FIFO viewer. They allow clearing the faults and clearing the FIFO.

3.3.8 When using the Signal Analyzer, a yellow arrow button and a special save button appear in the toolbar. The arrow, "***Upload ALZ Control***," executes all check marks. Next to it is the "***Save ALZ Channels***" button. This command saves the signal analyzer data, allowing it to be viewed using the Signal Analyzer viewer.

3.3.9 Copy Row. When adding sections to the Drive Personality screens, an entire row can be copied by clicking the “Copy Row” icon. This icon is enabled when a complete row has been saved and a new row has just received a section name. Note that the new row will have an address of one greater than the previous row.

3.4 STATUS BAR

The status bar displays information in the area across the bottom of the ADDAPT main screen. The status bar can be displayed or disabled by using the View pull-down menu. When ***Status Bar*** is checked, the status bar is displayed. This area can show the following:

3.4.1 Task Information

The status bar can display information about what will happen if an item in a pull-down menu or a button on the toolbar is selected.

3.4.2 Security Level

The status bar indicates the name of the current user and the level of access. If no one is logged in, it will indicate the default access level.

3.4.3 Computer Time

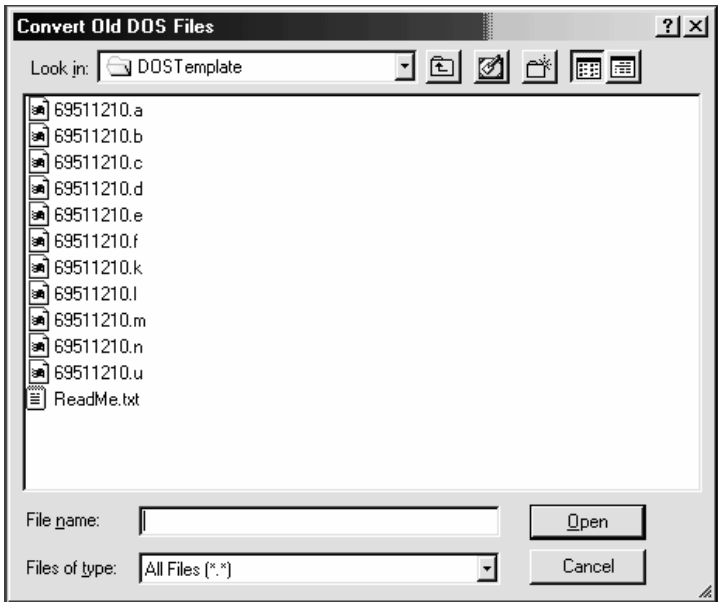
The current computer time is displayed.

3.4.4 Default Configuration File

Status bar information includes the name of the configuration file in use.

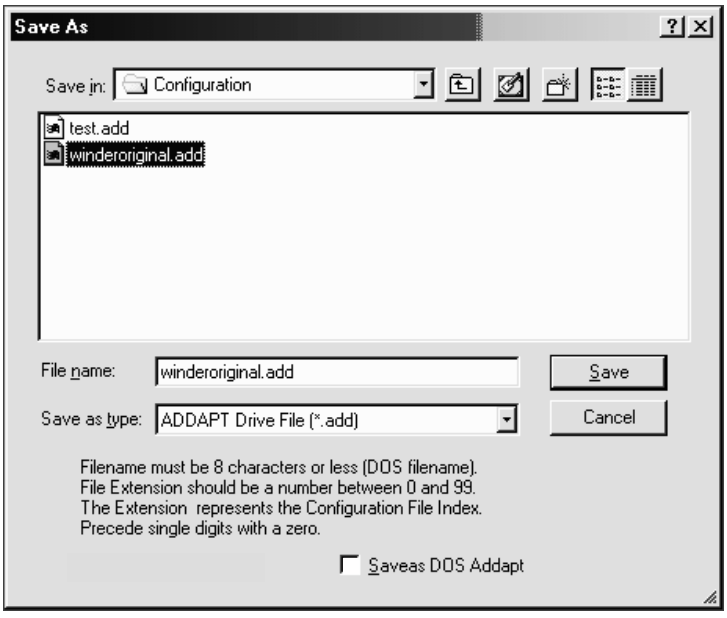
3.5 DOS ADDAPT FILES

Existing DOS version cal/config and template files may be opened using the DOS Conversion Utility command in the File pull-down menu. Figure 3-5, the first screen, lets you convert the old DOS files to a new Windows ADDAPT file. In DOS, each data group is normally a separate file (see Table 2-1). Select and open one filename, and all data groups with the same "filename" and format will be converted at the same time, using Figure 3-6, and saved as a single, tabbed, maintenance file such as shown in Figure 4-5. These Windows ADDAPT maintenance files have a .add extension.



WINADC5LAN

Figure 3-5. DOS ADDAPT Open Dialog Box



WINADC6LAN

Figure 3-6. DOS ADDAPT Save As Dialog Box

SECTION IV

MAINTENANCE PACKAGE

4.1 INTRODUCTION

Functions of the maintenance package include downloading and uploading parameter data to the drives, creating, saving and retrieving parameter data to and from disk files, and editing parameter data off-line as well as in real time.

4.2 PARAMETER EDITING

4.2.1 General

Editing drive parameter data may be accomplished in several ways. Choosing ***Open*** from the File pull-down menu and selecting a Drive Maintenance file (*.add) allows the user to edit a specific, previously stored maintenance file. ***New*** allows you to define a system of drives with a System Configuration file (*.cfg). ***New*** is seldom used. The preferred method of creating a new system config file when on-line is to use the Auto Configure function, which automatically creates a new configuration file as described in paragraph 2.4.1. A way to perform an online or offline edit is via the Drive Personality Data screen (Figure 2-3), where you can right click on the desired section and select ***New Maintenance File*** from the provided menu. The following paragraphs provide details. TABLE 2-1 describes usage and name formatting of different file types.

4.2.2 File Open

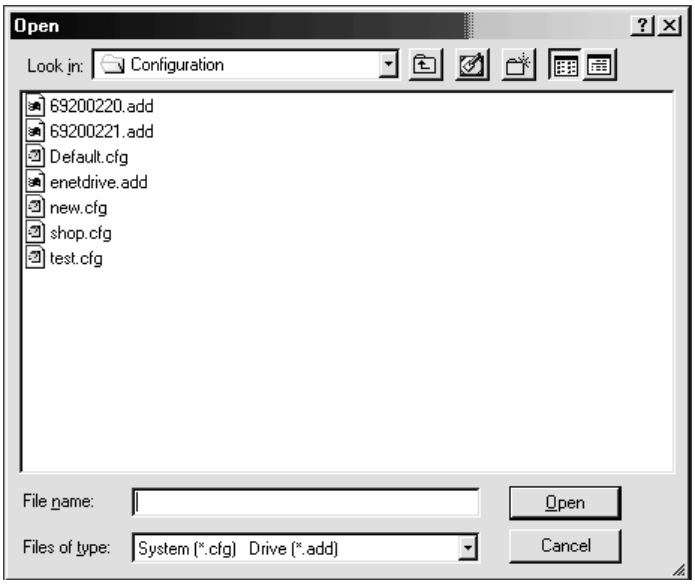
Choosing ***Open*** from the File menu brings up the Open dialog box shown in Figure 4-1. Use this standard Windows screen to find, select, and open a previously stored ADDAPT Maintenance file (*.add). The Maintenance Grid, shown in Figure 4-5, appears. This screen is used in any parameter editing task; a full discussion is given in paragraph 4.2.5. After completing the editing task, select either ***Save*** or ***Save As*** from the File menu. Figure 4-2 shows the Save As dialog box. Files must be renamed when using ***Save As***.

Save As also allows a *.add file to be converted to its corresponding DOS ADDAPT files by checking the Save As DOS Addapt box and following the directions for the extension name. The two digit file extension, 00-99, must be n-1, where n is the number in the # column of the DOS Configuration utility. To view the DOS Configuration Utility, type Config at the C:\Addapt DOS prompt and select Drive Data. (Note that DOS Addapt is required.)

NOTE

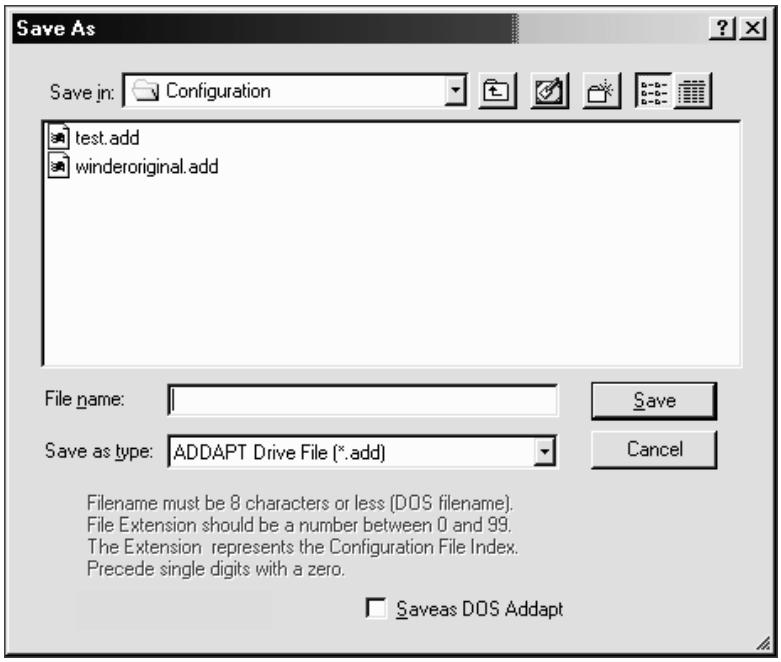
The section numbers on the Drive Personality Data Screen, Figure 2-3, may differ from the # column of the DOS Config, if not entered in the same order.

File > ***Open*** is also used to open a drive personality .cfg file to edit parameters per paragraph 4.2.4.



WINADD1LAN

Figure 4-1. Open Dialog Box

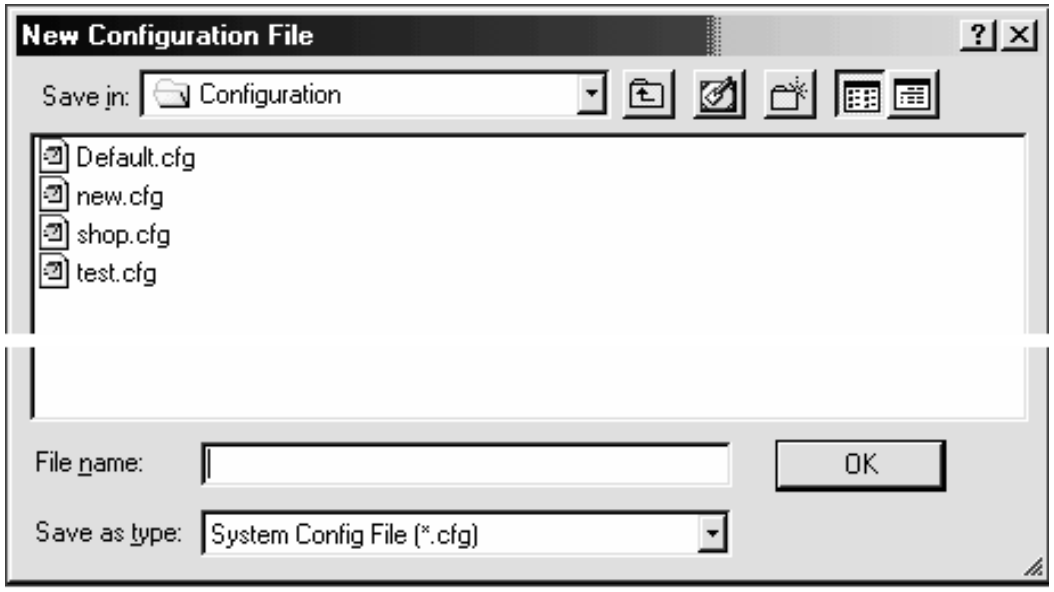

Save As
Save in: Configuration
test.add
winderoriginal.add
File name:
Save
Save as type: ADDAPT Drive File (*.add)
Cancel
Filename must be 8 characters or less (DOS filename).
File Extension should be a number between 0 and 99.
The Extension represents the Configuration File Index.
Precede single digits with a zero.
Saveas DOS Addapt

WINADD2LAN

Figure 4-2. Save As Dialog Box

4.2.3 File New

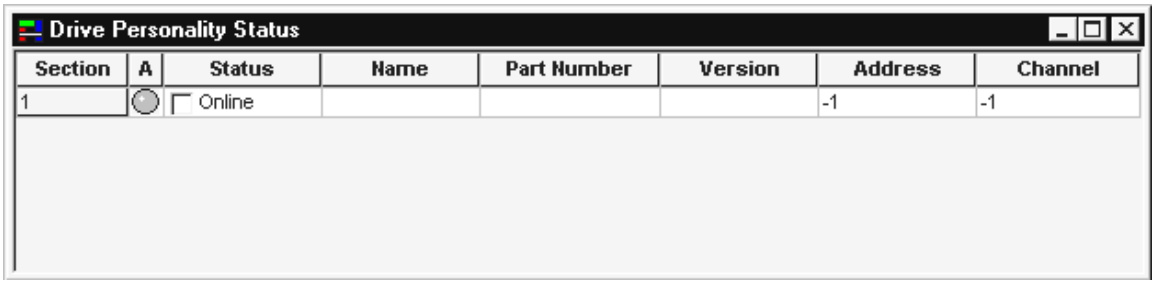
As an alternate to using Auto Configure, a new drive personality (system config) file may be created using ***New*** in the File pull-down menu. Choosing ***New*** brings up the window shown in Figure 4-3a, which allows naming a new drive personality data file (*.cfg).



WINADD3ALAN

Figure 4-3a. New Drive Personality Filename

Upon selecting OK, a dialog box similar to Figure 4-3b is presented, into which valid software part numbers, version numbers, etc., must be entered. This entered text is red until it is saved. Saving it is accomplished by simply clicking on a different section. If you fail to click outside of the row to save it, you will be prompted to save when you exit the dialog.



WINADD3BLAN

Figure 4-3b. Drive Personality Data Screen

When ADDAPT is opened for the first time, the initial system config file available is default.cfg. This substitute default file should not be confused with the system config file that will normally be active. After completing the auto configure, the user will be asked if that configuration should be used as “default” from then on.

4.2.4 Editing from Drive Personality File

The following provides the most direct way to edit parameters: When viewing the Drive Personality Data Screen (Figures 2-3 and 2-3a), right-clicking on a section NAME gives the user some or all of the following choices: ***Drive Reset***, ***Fault FIFO***, ***New Maintenance File***, and ***Signal Analyzer Setup***. Choosing ***New Maintenance File*** takes the user directly to the Maintenance Grid shown in Figure 4-5. Alternately, ***ADDAPT Maintenance File*** may be selected from the Tools pull-down menu and the drive chosen from the Select Section dialog box (Figure 4-4) which appears. Online editing may be performed. (If the section is online, the user will be asked whether he wants to edit it online or not.) The following paragraph 4.2.5 discusses editing parameters.

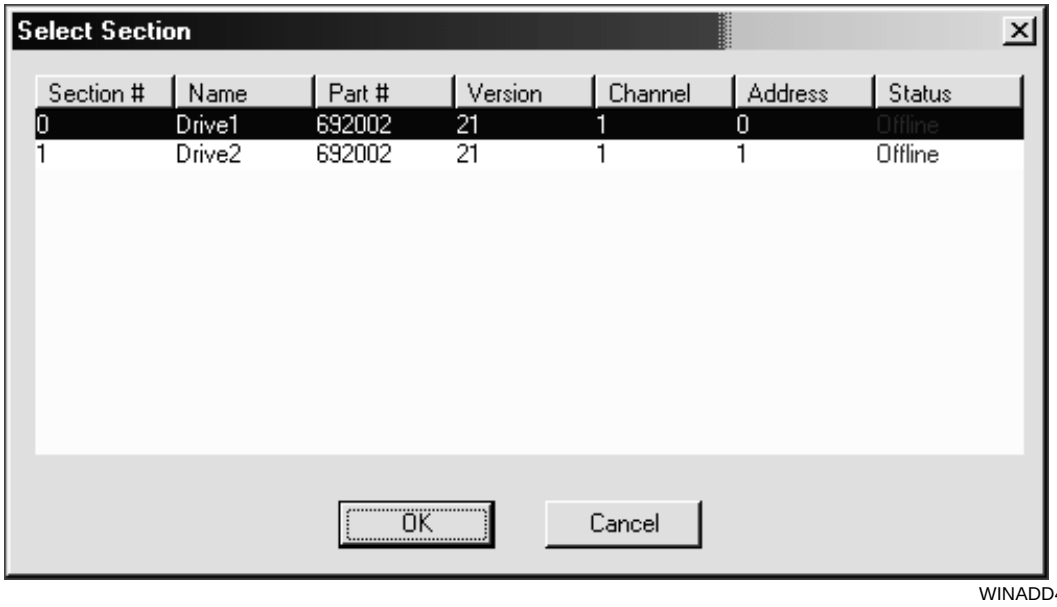


Figure 4-4. Select Section Dialog Box

4.2.5 Maintenance Grid

Refer to Figure 4-5.

The Maintenance Grid has tabs above each grid. Click the tabs to see other DATA GROUPS. Data groups are (A) APB (edit units), (T) Tables, (C) Calibration, (P) Configuration, (X) Drive Calibration, and (Y) Drive Configuration. By default, the Drive Calibration data group is selected. There are also tabs to set the drive signal analyzer calibration (ZX) and configuration (ZY).

(ZY) Analyzer Configuration | (A) APB | (T) Tables

(X) Drive Calibration | (Y) Drive Configuration | (C) Calibration | (P) Configuration | (ZX) Analyzer Calibration

	Marked	Label	Value	Units
X000	☐	I/O V-REF	-7.000000	VOLTS
X001	☐	MOTOR Iarm	10.000000	% DRV
X002	☐	MOTOR Ifld	10.000000	% DRV
X003	☐	MFLD %SCALE	1.000000	
X004	☐	MFLD ASCALE	1.000000	
X005	☐	RBRDG RATIO	1.000000	Fwd/Rv
X006	☐	THERMAL TC	60.000000	SECs
X007	☐	M-TEMP WARN	120.000000	Deg C
X008	☐	TACH 1 GRat	1.000000	
X009	☐	TACH 1 RDia	0.318310	P-unit
X010	☐	TACH 1 EPR	960.000000	E/REV
X011	☐	TACH 1 ZERO	0.000000	
X012	☐	TACH 2 GRat	1.000000	
X013	☐	TACH 2 RDia	0.318310	P-unit
X014	☐	TACH 2 EPR	960.000000	E/REV
X015	☐	TACH 2 ZERO	0.000000	
X016	☐	COUNT 1 CAL	1.000000	LEN/E
X017	☐	COUNT 2 CAL	1.000000	LEN/E
X018	☐	INPT #1 CAL	10.000000	
X019	☐	INPT 1 ZERO	0.000000	
X020	☐	INPT #1 TC	0.000000	SECs
X021	☐	INPT #2 CAL	1.000000	
X022	☐	INPT 2 ZERO	0.000000	
X023	☐	INPT #2 TC	0.000000	SECs
X024	☐	INPT #3 CAL	1.000000	
X025	☐	INPT 3 ZERO	0.000000	

WINADD5LAN

Figure 4-5. Maintenance Grid

More than one drive edit window can be shown at the same time for different sections or the same section. If opened for the same section and the same tab is selected, both windows will represent the same file. Marking parameters (paragraph 4.2.5.5) in one window will appear in all other edit windows of the same section (multiple views of the same document), if all views are either online or offline. The Window pull-down menu and toolbar icons provide typical commands that offer convenient ways of manipulating and viewing these windows.

When editing parameters, the commands available from the Edit pull-down menu, and their tool-bar button equivalents, will probably be useful. When using ***Find*** and ***Replace***, note that the cursor must be in the column that is to be searched. Also, ***Replace*** is enabled for APB and calibration units to allow for global replacement.

After changing a value, press enter, or select another cell in the table, to enter the change. The program will check to make certain any change is within the limits of the program personality. A valid number must be entered. See View ... Parameters screens, discussed in the following paragraphs.

When the operator makes a change, the parameter value changes to red until the file is saved if offline. A parameter change is indicated by an asterisk if online and the parameter value is not equal to its original value.

4.2.5.1 Calibration Edit

The data values may be edited by left clicking on the desired value. RIGHT clicking on the value gives you three choices: you can insert either the ***Default*** value or the ***Original*** value, or you can select ***View Parameters*** (Figure 4-6). View (Calibration) Parameters is a display-only window to aid in editing: it specifies what the original and default values are, and also what the limits are. A Tool-bar button (see paragraph 3.3) also can display View Parameters. NOTE: This button, and the Parameters command in the View menu, are the only ways to view parameters if you have already changed a value to an out-of-limits number.

Once a calibration value is selected and edited, press enter. The number is checked to see if it is valid and within its limits. If online, the value is sent to the drive. If offline, the value will turn red, indicating it has not been saved yet.

Units may also be edited. If changing several identical units at once, the Edit pull-down menu Find/Replace feature may be useful, for example, when changing all occurrences of METERS to FEET.

The user may save the edited file by selecting ***Save*** or ***Save As*** under the File pull-down menu.

NOTE

Saving the file will save all changes made to any of the data groups.

Once saved, it may be edited later using the ***Open*** command in File (see paragraph 4.2.2.)

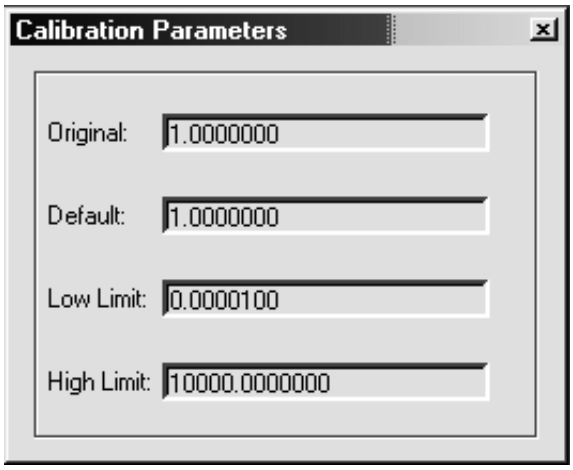


Figure 4-6. View Calibration Parameters

4.2.5.2 Configuration Edit

Right clicking on the selection ("value") gives you three choices: you can insert either the ***Default*** selection or the ***Original*** selection, or you can select ***View Parameters*** (Figure 4-7). View (Configuration) Parameters is a display-only window to aid in editing: it specifies the type and what the original and default selections are.

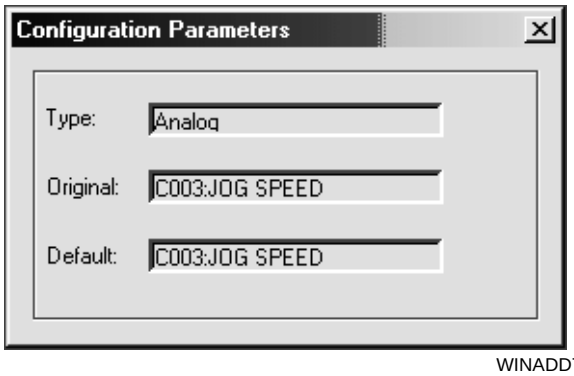
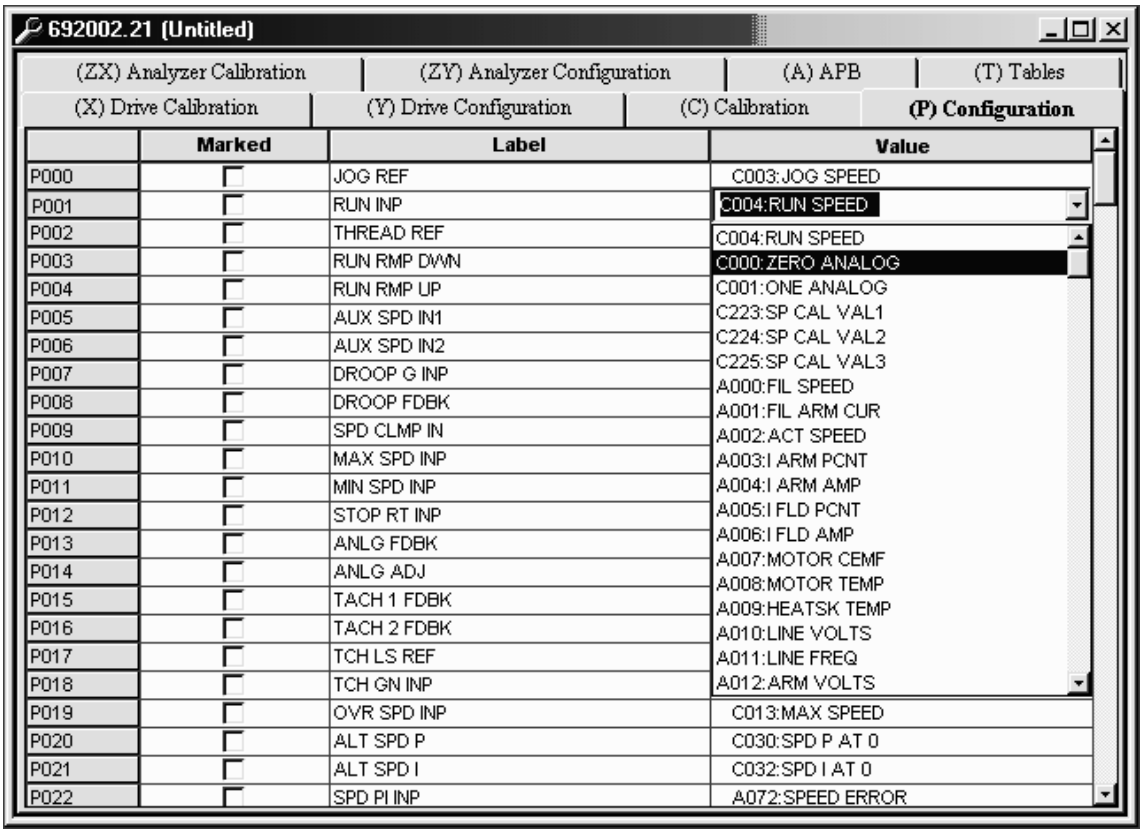


Figure 4-7. View Configuration Parameters

Left clicking once on a Configuration or a Drive Configuration data group selection ("value") highlights it; left clicking on the down arrow that appears to the right of the value displays a drop-down list box which gives all possible selections. Figure 4-8 shows an example. Clicking on a selection in the list box makes the selection. If online, the new selection is then sent to the drive. If offline, it will turn red, indicating that it has not been saved yet.



WINADD8LAN

Figure 4-8. Configuration Value Selection

The user may save the edited file by selecting ***Save*** or ***Save As*** under the File pull-down menu.

NOTE

Saving the file will save all changes made to any of the data groups.

Once saved, it may be edited later using the ***Open*** command in File (see paragraph 4.2.2.)

4.2.5.3 Tables Edit

The Tables data group is different from the other tabs in the Maintenance Grid. Two-dimensional graphs may be created and viewed by entering 16 pairs of X and Y coordinates. See Figures 4-9 and 4-10. This feature could be used to observe field weakening, for example.

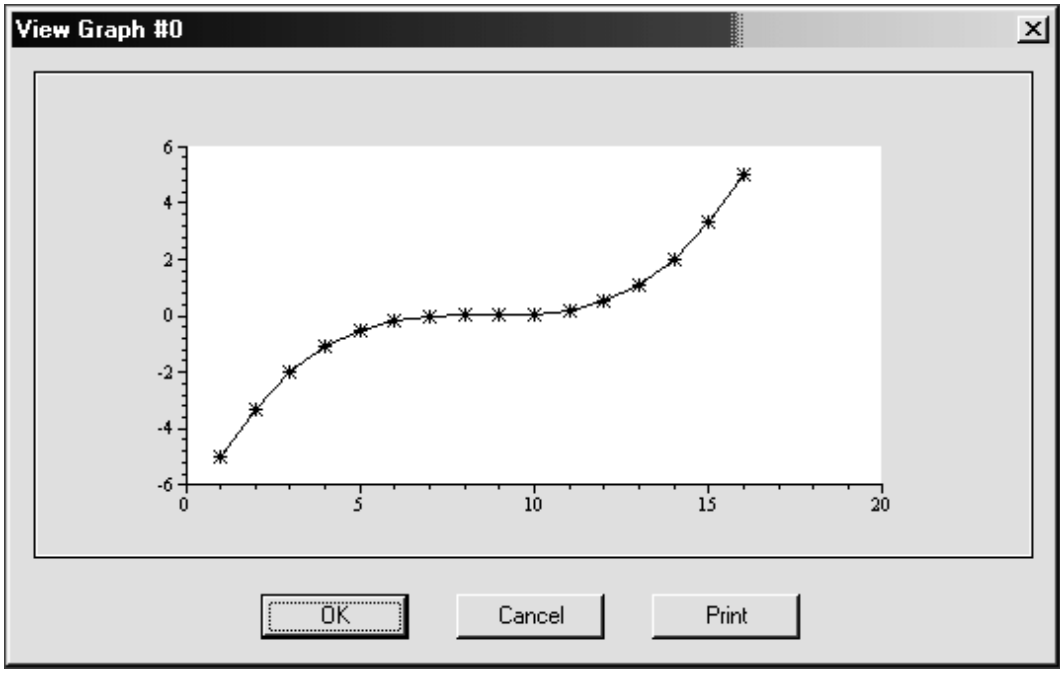
692002.21 (table.add)

(X) Drive Calibration | (Y) Drive Configuration | (C) Calibration | (P) Configuration
(ZX) Analyzer Calibration | (ZY) Analyzer Configuration | (A) APB | **(T) Tables**

0	Marked	X	Y
T000	☐	1.000000	* -5.000000
T002	☐	2.000000	* -3.300000
T004	☐	3.000000	* -2.000000
T006	☐	4.000000	* -1.100000
T008	☐	5.000000	* -0.500000
T010	☐	6.000000	* -0.200000
T012	☐	7.000000	* -0.050000
T014	☐	8.000000	* 0.000000
T016	☐	9.000000	* 0.000000
T018	☐	10.000000	* 0.050000
T020	☐	11.000000	* 0.200000
T022	☐	12.000000	* 0.500000
T024	☐	13.000000	* 1.100000
T026	☐	14.000000	* 2.000000
T028	☐	15.000000	* 3.300000
T030	☐	16.000000	* 5.000000

WINADD9LAN

Figure 4-9. Edit Tables Window



WINADD10LAN

Figure 4-10. Graph of Table Data

Each file can have four tables and graphs, which are selectable using the up and down arrows in the upper-left corner of the table (see Figure 4-9). The tables are numbered 0, 1, 2, and 3. Enter the coordinates desired by left-clicking on the value and editing it. Using the up and down arrow keys to select the next coordinate to be edited may be easier than selecting with a mouse.

Right clicking on a value (that is not being edited at the time) gives you three choices: you can insert either the ***Default*** value or the ***Original*** value, or you can select ***View Parameters*** (Figure 4-11). View (Table) Parameters is a display-only window to aid in editing: it specifies what the original and default values are, and also what the limits are.

To see the graph of the table, select ***Graph*** from the View menu. The graphical display screen includes buttons to select either ***Print***, or ***OK*** (which closes the graph screen and returns to the table).

The tables are saved, along with all the other data groups in the file, using the commands in the File pull-down menu.

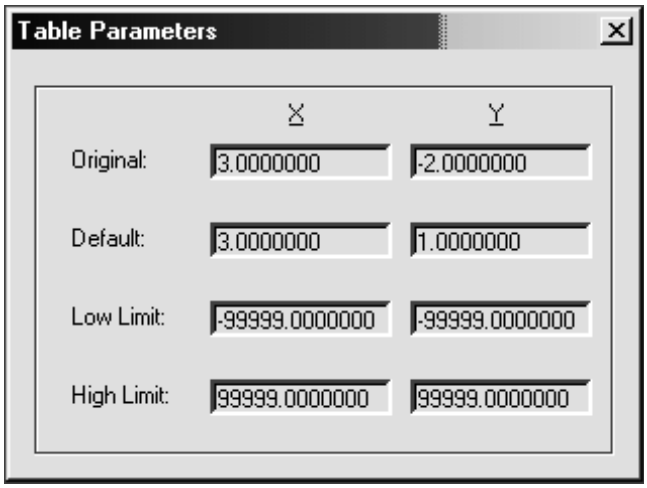
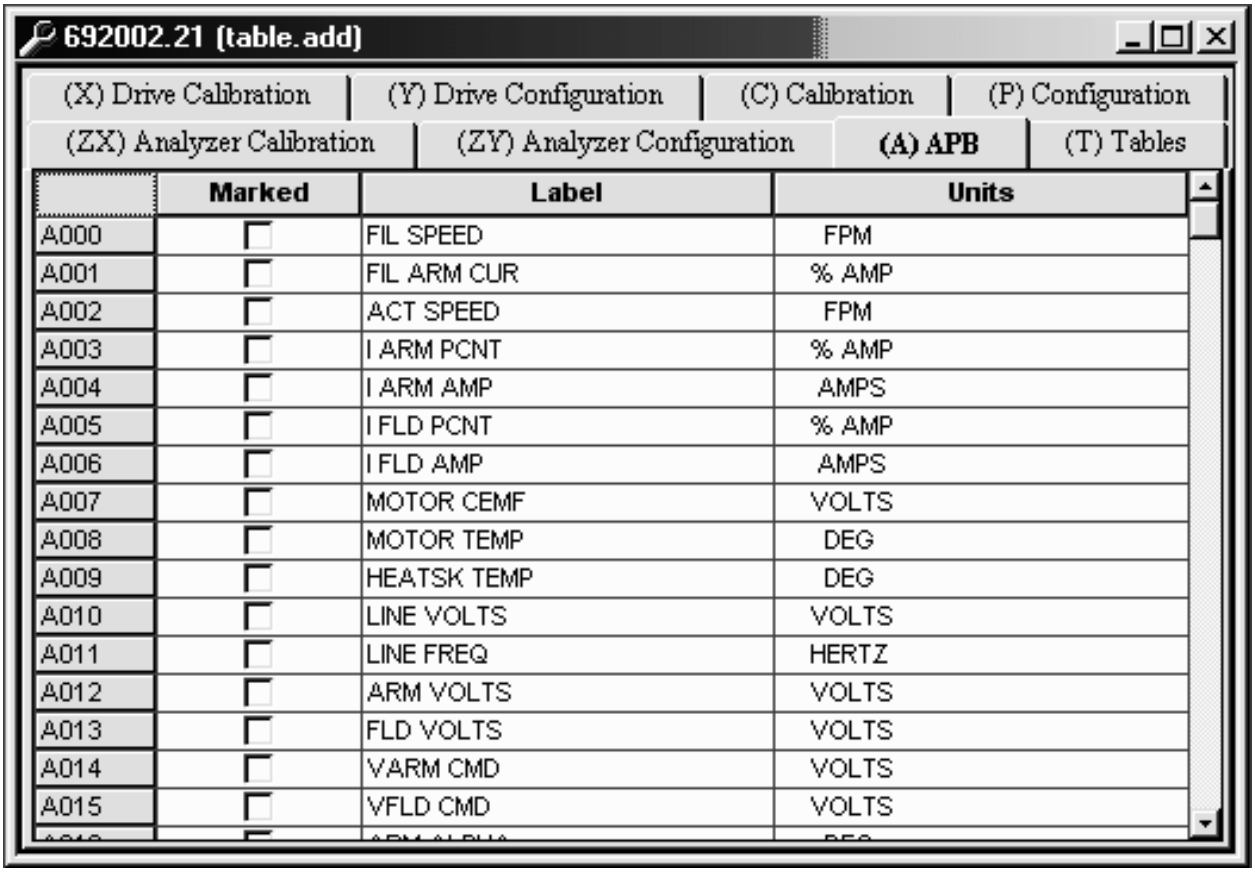


Figure 4-11. View Table Parameters

4.2.5.4 APB - Units Editing

Selecting the APB tab (Analog Patch Board) allows the user to change the units displayed for an analog block output. See Figure 4-12. By left clicking on the units for any parameter, what will be displayed for units may be changed to anything desired, up to six characters. TIP: default units often have a blank space preceding the characters, which must be used to have all six spaces available. Also, the Edit pull-down menu has a find/replace feature that is useful if changing several units at once; for example, to change all occurrences of METERS to FEET. The changes may be saved, along with all other data groups in the file, by using the commands in the File pull-down menu. Note that using Find/Replace with a virgule (/) in the text may give unintended results.



WINADD12LAN

Figure 4-12. Edit APB (Units) Window

4.2.5.5 Marking Parameters

Marking is done by clicking in the check box in the "Marked" column (see Figure 4-5, Maintenance Grid). This allows selecting certain parameters to be downloaded. All boxes in the open data group may be marked (or unmarked) at once by using commands in the Edit pull-down menu.

4.3 UPLOAD

Upload allows the user to upload parameter data from the currently selected drive and save it to a file on disk.

The Upload Data dialog box, Figure 4-13, may be displayed by selecting it from the Tools menu or by clicking the up-load button on the toolbar. The bottom box in Figure 4-13 provides a drop-down list of on-line drives. Select a drive and a name for the file. Click the ***Upload*** button. If the file name already exists, a message appears and the user is asked whether to replace the existing file or not. The program retrieves all data from the drive and saves it. A time-bar indicates progress. Right-clicking on the section in the Drive Personality Data Screen also lets uploading be done by saving the edited on-line file (see paragraph 4.2.4). An empty "Drive" Box (Figure 4-13) indicates no drives are online.

The data stored will also contain section name and number, time and date of storage, and the type of data.

The user must have a Maintenance or higher access level to upload.

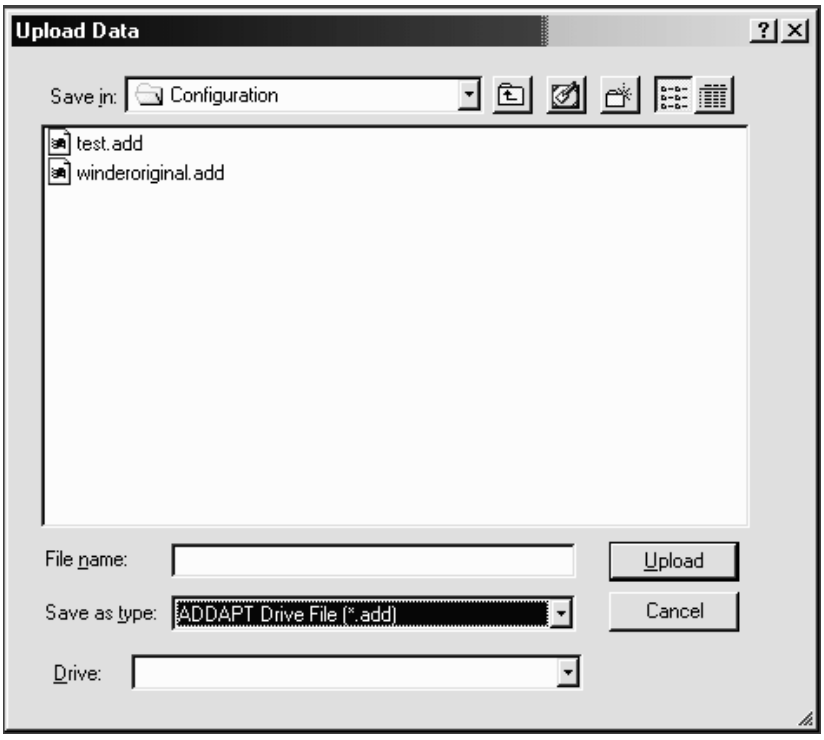
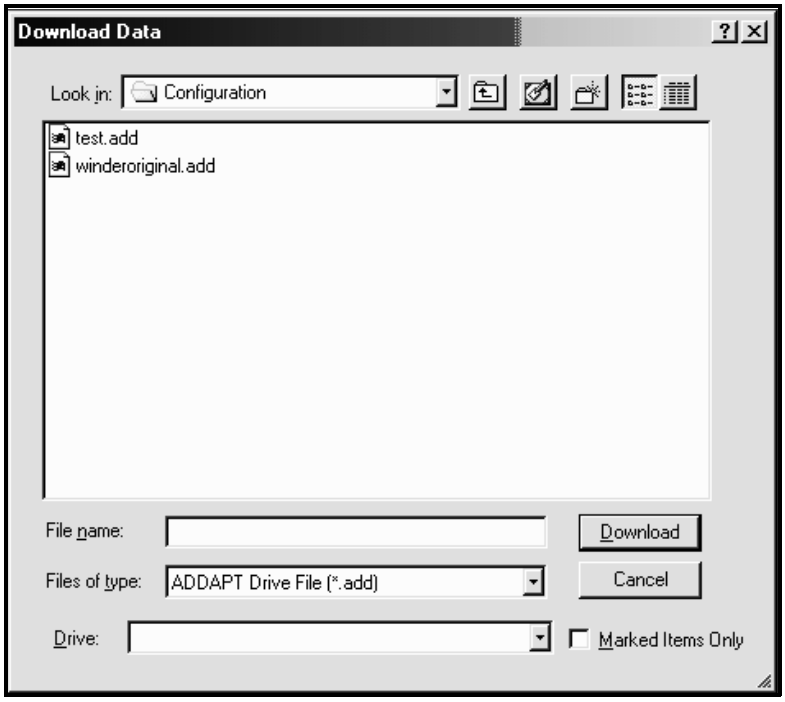


Figure 4-13. Upload Data Dialog Box

4.4 DOWNLOAD

Download enters values from a previously saved file on disk into the currently selected drive's memory. The Download Data dialog box, Figure 4-14, may be displayed by selecting it from the Tools menu or by clicking the down-load button on the toolbar. The bottom box in Figure 4-14 provides a drop-down list of on-line drives. Select a drive, and use the upper boxes to select the file to be downloaded. Click the Download button. The downloaded file software version numbers must match the destination drives. Otherwise, the user will be given a warning message stating the difference, which he can respond to by either continuing or canceling the download. To download only the marked parameters, click the "Marked Items Only" checkbox.

The user must have a Maintenance or higher access level to download.



WINADD14LAN

Figure 4-14. Download Data

SECTION V

FAULT FIFO VIEWER

5.1 GENERAL

Faults and warnings alert the user to the condition of the drive and motor. Faults are conditions that can damage the motor or drive if the condition continues. To protect against damage, the drive opens the DOK (Drive OK) contact which in turn opens the motor contactor. All faults are level sensed and must be rectified before resetting.

5.2 FAULT QUEUE

The fault queue in the drive stores the last sixteen faults using a FIFO method of data storage. The FIFO faults reside in RAM and, if a power loss occurs, the faults are saved in EEPROM.

ADDAPT can access the fault FIFO of a connected drive, enabling the user to view any drive's FIFO in real time. Select ***Fault Fifo*** in the Tools menu to bring up the Select Section dialog box (Figure 4-4). Choosing a section and clicking OK will display the Fault Fifo Viewer (Figure 5-1). The most recent fault will be at the top of the displayed list, followed by up to 15 faults in the queue.

5.3 CONTROLS

The ADDAPT user will have buttons in the toolbar to clear faults and to clear the FIFO (see paragraph 3.4). Anyone can clear a fault, but a Maintenance level is required to clear the FIFO.

The current FIFO or all online FIFOs may be printed. The printout includes the drive name and number, date, and an indication of which fault is most recent.

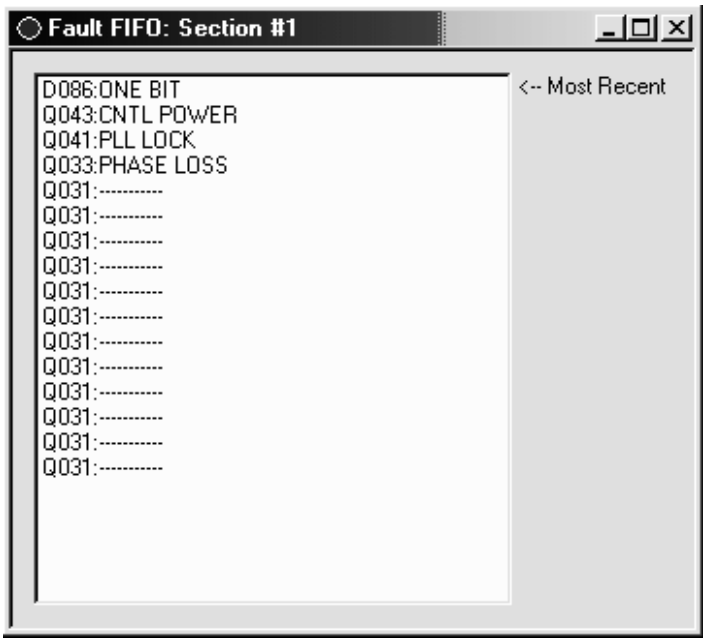


Figure 5-1. Fault FIFO Viewer

SECTION VI

SIGNAL ANALYZER CONTROL

6.1 INTRODUCTION

Each drive contains a four-channel, high-speed signal analyzer to help isolate process problems from drive or tuning performance. The analyzer can be configured to record four desired variables (they may be digital or analog) and then triggered to save data before and after the next speed upset. Later, the Signal Analyzer Viewer can be used to manipulate and interpret the captured information. Refer to Section V of the Avtron ADDvantage-32 Drive System manual supplied with your equipment for setup and more detailed instructions for the drive's signal analyzer control.

6.2 ADDAPT SIGNAL ANALYZER CONTROL

The ADDAPT signal analyzer control function allows the user to reset, trigger, upload, enable, arm, and review the status of a drive's signal analyzer. Also, the separate Signal Analyzer Viewer may be selected.

6.2.1 Editing the Drive's Signal Analyzer Calibration and Configuration

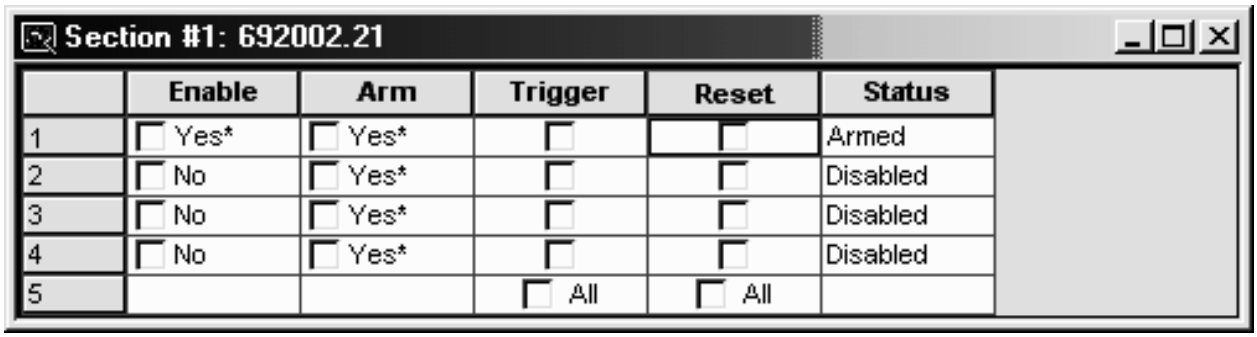
Before using the ADDAPT Signal Analyzer control function, the drive signal analyzer's calibration and configuration parameters should be set up as desired. These parameters may be customized by selecting ***ADDAPT Maintenance File*** (Tools pull-down menu). See paragraphs 4.2.4 and 4.2.5. Click on the analyzer calibration (ZX) or the analyzer configuration (ZY) tabs. Each channel (1-4) must be set up separately. Select the channel using the up and down arrows in the upper left corner of the Maintenance Grid.

6.2.2 Using ADDAPT Signal Analyzer

The signal analyzer is accessed from the Drive Personality Data screen shown in Figure 2-3a. Right click on a section NAME and select ***Signal Analyzer Control***. Alternately, Signal Analyzer Control may be selected from the Tools pull-down menu and the drive chosen from the Select Section dialog box (Figure 4-4) which appears. Each signal analyzer function operates on a selected drive (section).

A new pull-down menu is now available in the ADDAPT main screen titled Actions. It contains the commands ***Update Analyzer*** and ***Save Channels***. These are equivalent to the buttons "Update Alz Cntl" and "Save Alz Channels" that appear in the toolbar when the signal analyzer control is selected.

The screen now displayed (Figure 6-1) lists the controls and status of all four channels for the selected drive. The two columns on the left, Enable and Arm, allow toggling between Yes and No. Click in the check box next to the word to be changed to place a check mark there. An asterisk indicates that the selection cannot be toggled. In the Trigger and Reset columns, click in the check box to place a check mark in that channel's box, or select the "All" box for all four channels.



WINADF1LAN

Figure 6-1. Signal Analyzer Setup

For all four columns, the change or action requested by checking boxes will be executed upon clicking the "Update ALZ Cntl" button in the toolbar.

The Status column indicates one of the following possibilities:

Disabled	-	Channel is not enabled or armed.
Unarmed	-	Channel is not armed.
Armed	-	Channel is ready to be triggered.
Triggered	-	Channel is in process of gathering data.
Done	-	Data is ready to be uploaded and saved.

6.2.3 Example Procedure

After the analyzer calibration and configuration is set up, a typical step-by-step procedure for using the ADDAPT signal analyzer function would be as follows:

1. Status of the channel or channels should say "Disabled" or "Unarmed" to start at this point. If it says "Armed", go to step 3. "Done" may indicate an unsaved file. See step 4 to save it, or step 5 to reset. If it says "Triggered", data collection is in progress -- wait for "Done" on this channel.

2. Enable and arm by checking the required boxes and then clicking the yellow up arrow. Status should indicate "Armed".

3. Trigger by clicking the box or boxes in the Trigger column and then the yellow up arrow. (This is only true for a manual trigger.)

   Status will indicate "Triggered" during data collection and then "Done".

4. The "Done" file should be saved before resetting, if you want to, since "Reset" clears the last analyzer run. Files MUST be saved if you want to view them using the Signal Analyzer Viewer (SAV) package. Save by clicking the "Save Alz Channels" button in the toolbar.

   The Save Channels dialog box will appear (Figure 6-2), prompting the user to enter the saved file name only if the channel is in the done state. The file name will be created with an .ALZ extension. The name and path may be typed into a box in Figure 6-2, or the browse button just to the right of the box may be clicked. The browse button displays a typical Windows dialog box where one can browse locations. If the path is not entered, the file will be written to the default directory selected in ***Options*** under the Tools menu (Figure 2-1), in the “Signal Analyzer files” box under the Parameters tab.

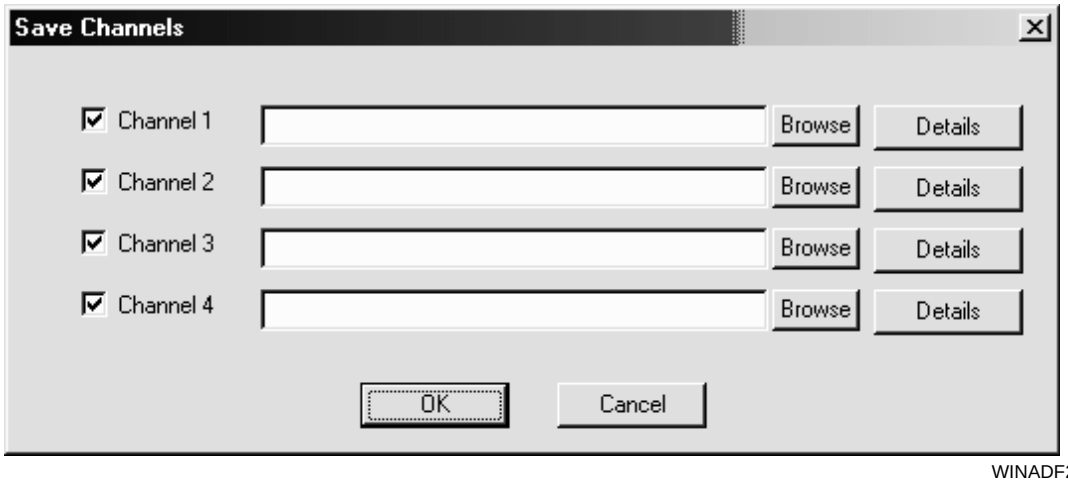
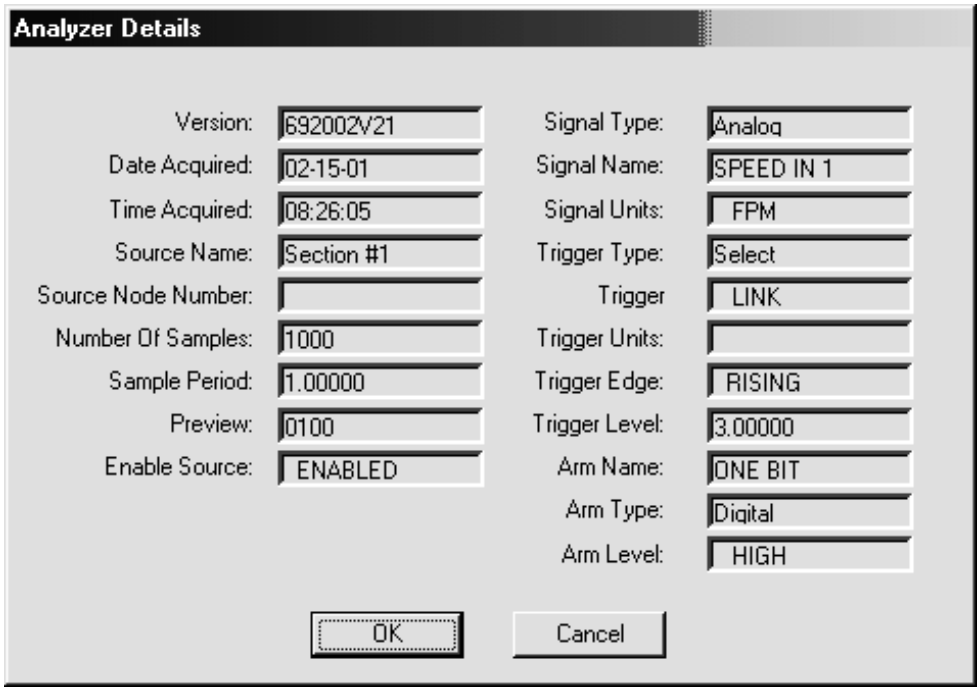


Figure 6-2. Save Channels Dialog Box

Clicking the Details button for a channel produces the Analyzer Details screen, shown in Figure 6-3. A similar screen in Signal Analyzer Viewer, the Channel Properties Screen (Figure 7-10), will allow the user to view and add comments.



WINADF3LAN

Figure 6-3. Analyzer Details

After selecting the file name and clicking OK, all channels that are completed will be uploaded and saved. Every channel selected must have a filename entered. To save only certain channels, click in the check box next to the channel number (Figure 6-2) to toggle the check mark on or off as required.

5. Reset by clicking the box or boxes in the Reset column and then the Update ALZ Cntl button. Status will indicate "armed" after resetting.

See Section VII for further information on viewing the Signal Analyzer data.

SECTION VII

SIGNAL ANALYZER VIEWER

7.1 INTRODUCTION

The SIGNAL ANALYZER selection under the TOOLS menu allows viewing the ADD32 signal analyzer files that were collected using the SIGNAL ANALYZER CONTROL as explained in Section VI. The SIGNAL ANALYZER viewer provides a way to graphically view the collected data.

7.2 SIGNAL ANALYZER VIEWER

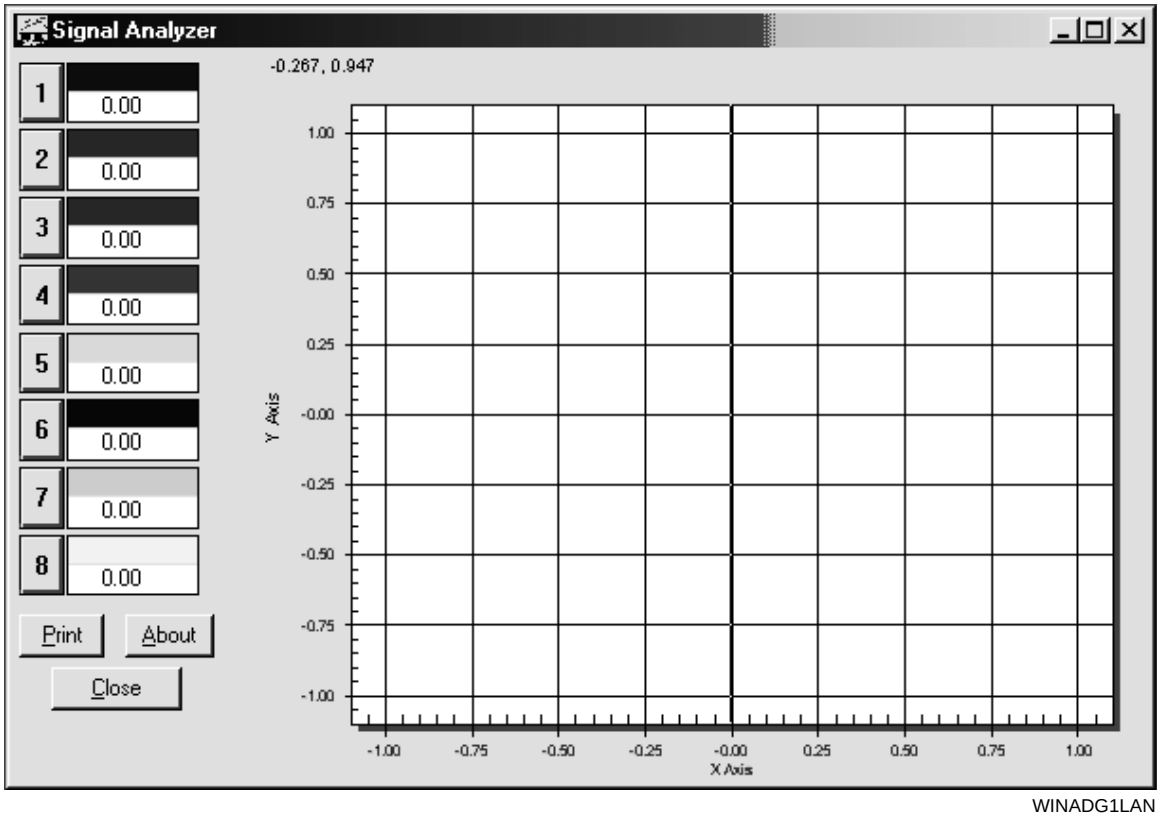
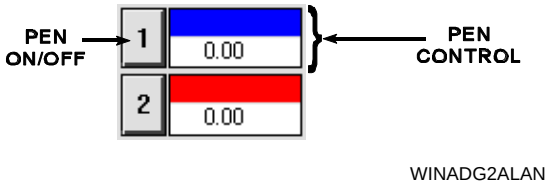


Figure 7-1. Basic Screen. 8 pens, time on x axis, scales determined by files loaded (autoscaling)



Pen Control Buttons

7.3 LOADING FILES

Right click on a PEN control to load an ANALYZER file into the pen.

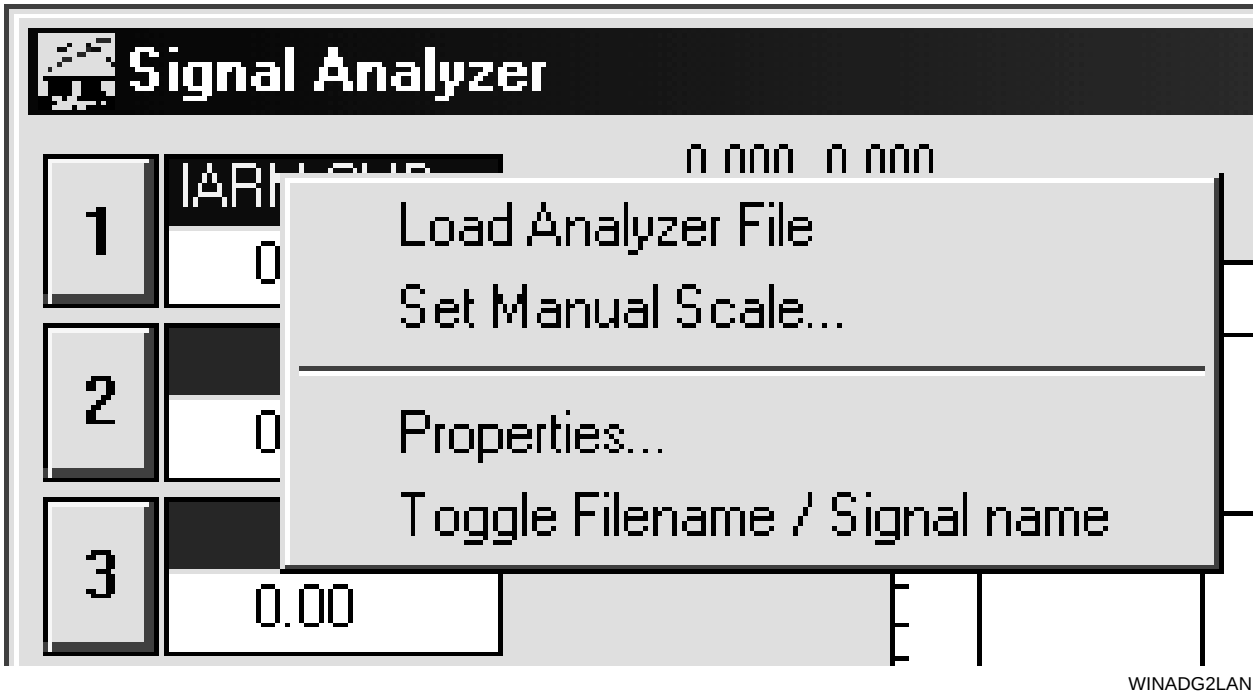
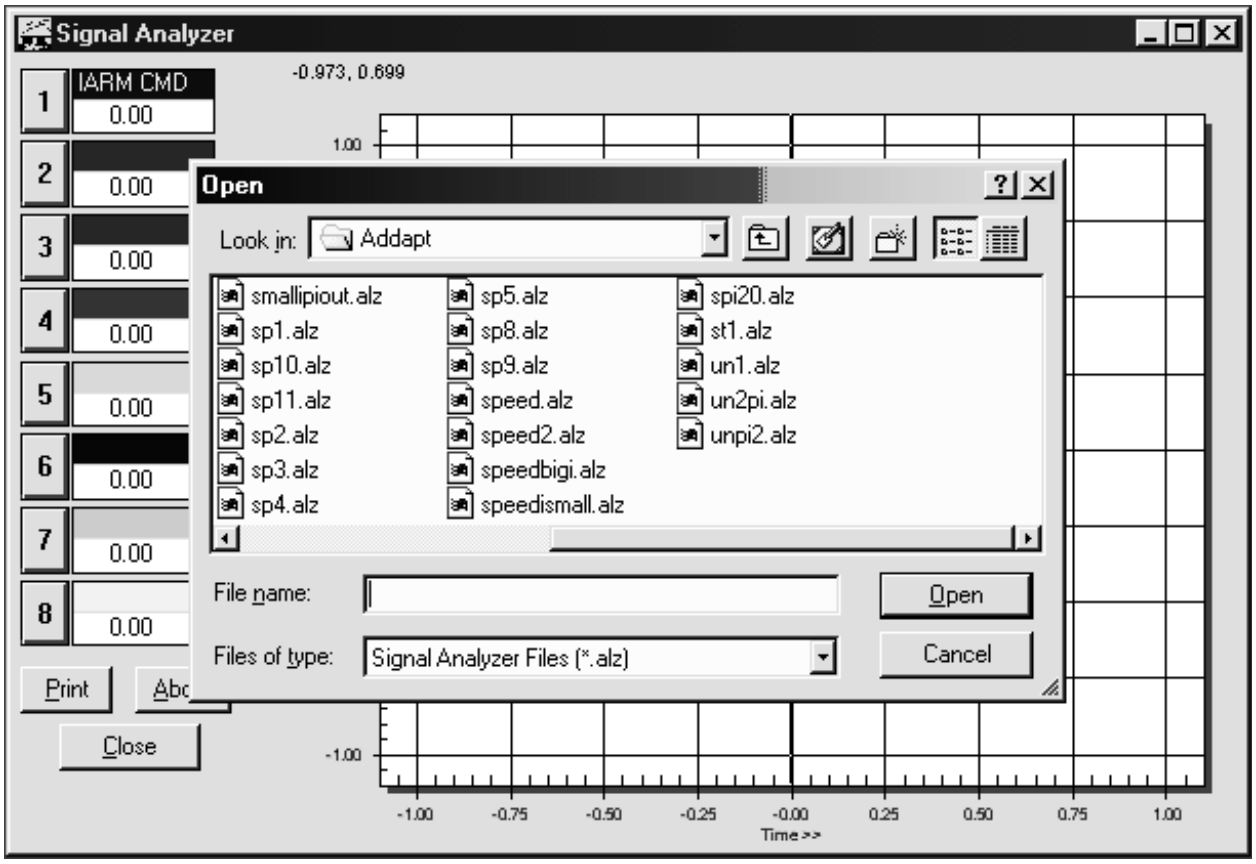


Figure 7-2. Loading Analyzer Files

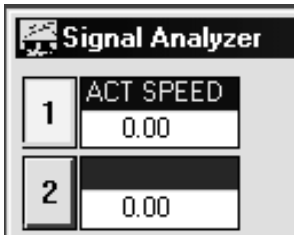
Select LOAD ANALYZER FILE, and the file selection window appears. Select the desired file; then press OPEN.



WINADG3LAN

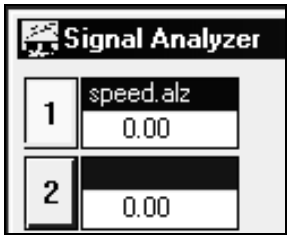
Figure 7-3. File Selection Window

After the file has loaded, the color portion of the pen control will show the ADD32 signal name (see enlarged details of screen). The text in the color portion of the pen control may be changed from the signal name to the file name by RIGHT CLICKING on the pen control and then selecting TOGGLE FILE/SIGNAL NAME.



WINADG3ALAN

Label Showing Signal Name

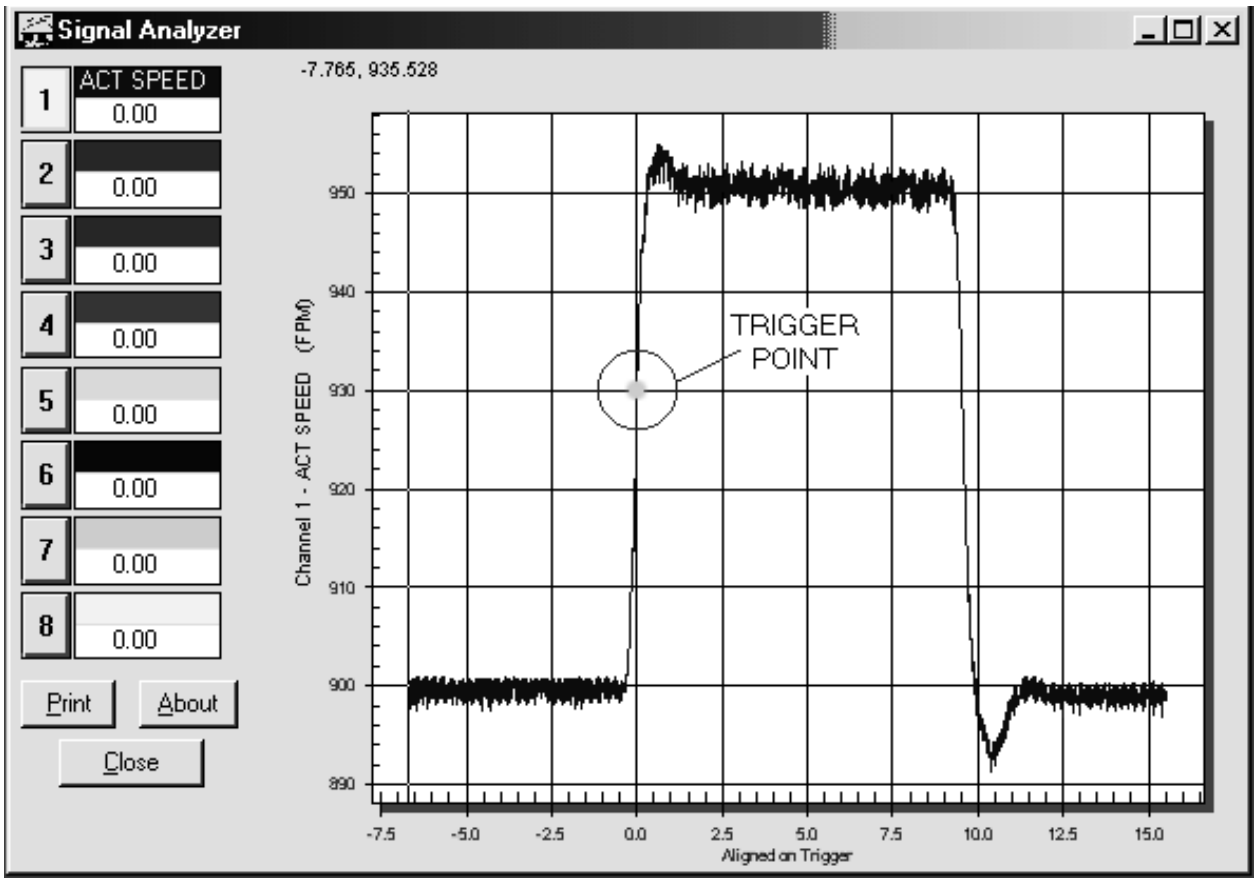


WINADG3BLAN

Label Showing File Name

7.4 VIEWING SIGNAL

Once the pen is loaded, clicking on the pen number button to the left of the pen control will allow the signal to be viewed. The button will turn yellow to indicate the pen is active. The signal will be shown on the graph with the color of the signal matching the color of the pen control. Figure 7-4 shows a graph with a single pen enabled.



WINADG4LAN

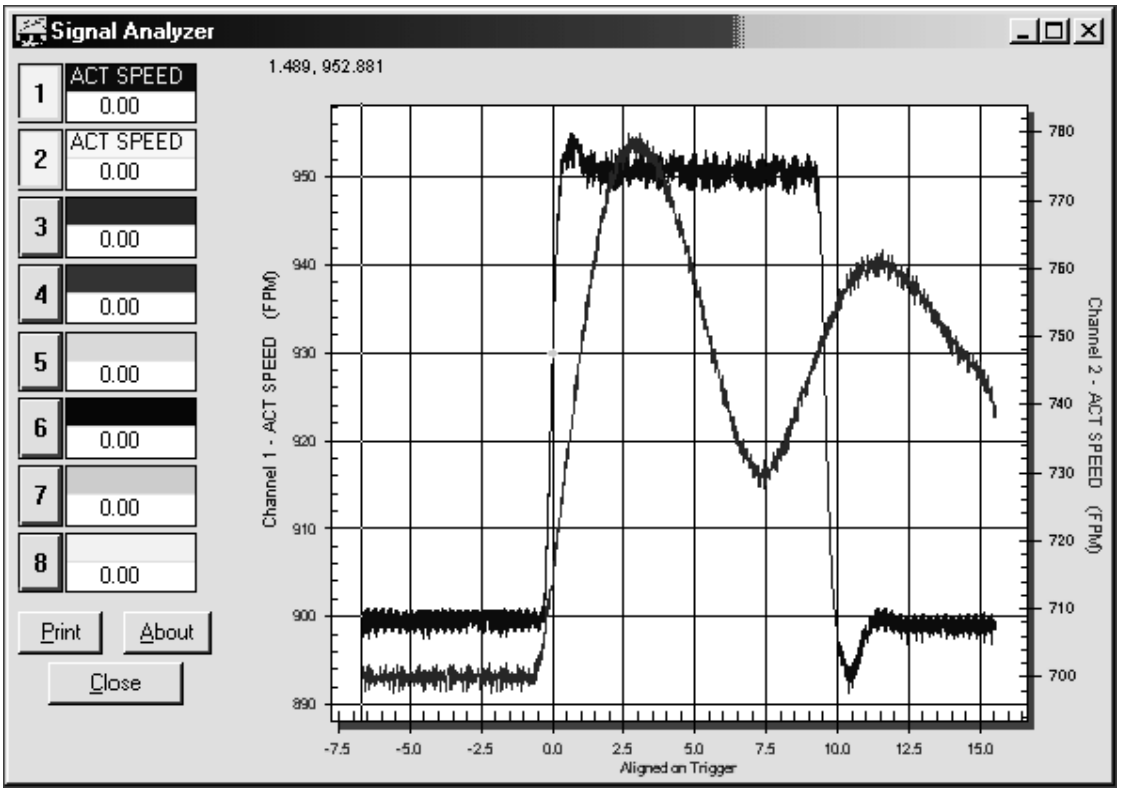
Figure 7-4. Viewing Signal

Note that the Y Axis label now shows the channel that is assigned to that axis and is scaled to show the full range of data contained in the file. The X axis shows a scale based on the trigger point ("aligned").

A second pen my be loaded in a manner similar to that explained above. When the second pen is enabled by pressing the button to the left of the pen control, the graph will change to show the y-axis of the second data set on the right side of the chart as shown in Figure 7-5.

The Y axis scale is displayed in one of three ways, depending on how many signals are being viewed. If one signal is viewed, the Y axis extents will be equal to the extents of the signal. If two signals are viewed, a right Y axis will be added and each view will be scaled as if viewed as a single trace (Figure 7-5). The curves are plotted with their trigger-points aligned at zero, allowing overplots of data taken at different times. If more than two signals are enabled, the Y axis will be normalized from -1 to 1 for all pens. Figure 7-6 shows three channels being displayed. They are normalized from -1 to 1, and plotted from .89 to 1 for maximum resolution.

See paragraph 7.7 for instructions on manually setting the Y axis scaling.



WINADG5LAN

Figure 7-5. Displaying Two Channels, Aligned X Axis

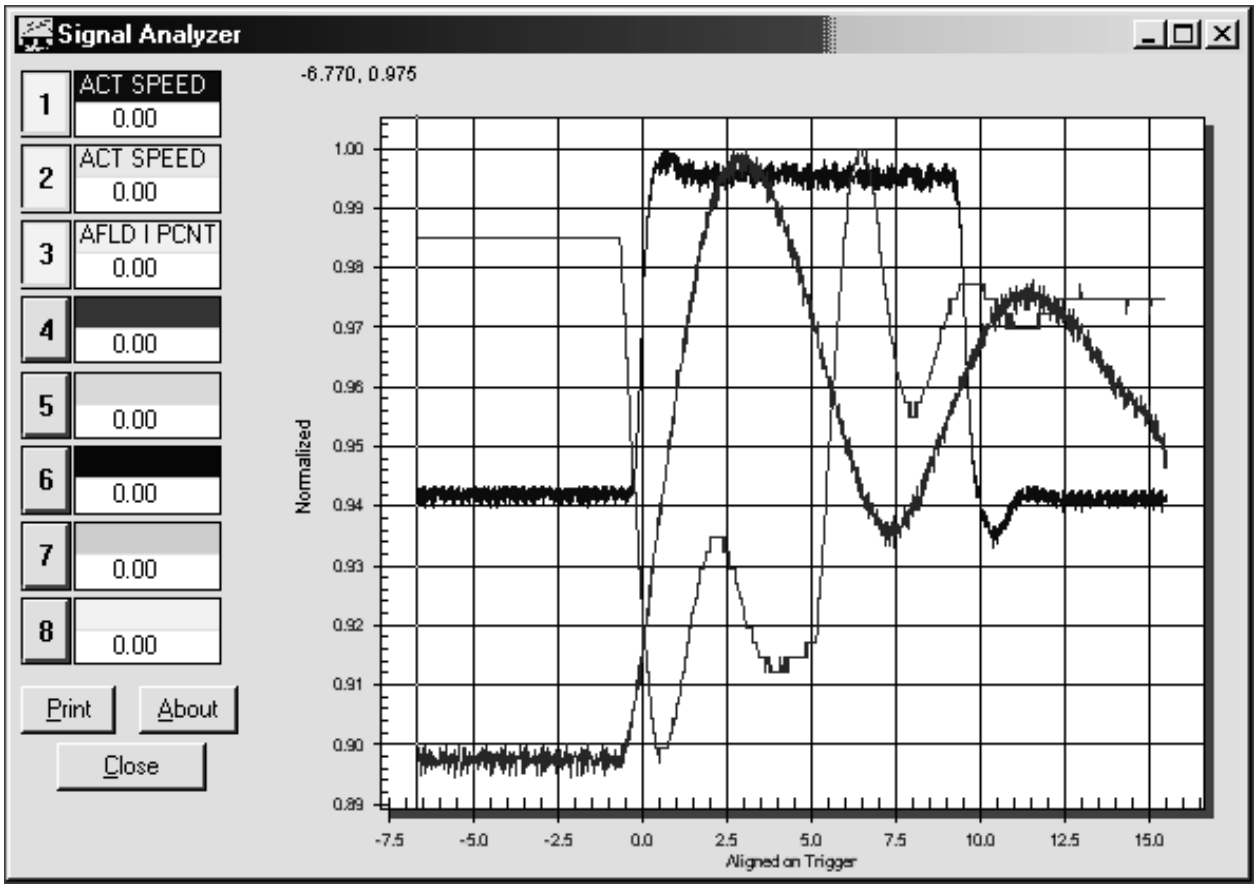


Figure 7-6. Displaying Three or More Channels

The normalization of each channel is performed as follows: the maximum value of the trace is found. All trace values are then divided by this maximum value. The resulting data is then plotted.

The normalized display mode will occur any time three or more pens are enabled. When less than three pens are enabled, the display will revert to showing actual data scales for the Y Axis(es).

Clicking on the Pen number button of one of the active channels will cause the pen to no longer be displayed. Note that one pen must always be enabled.

7.5 DATA CURSOR

When one or more pens are enabled, a data cursor may be enabled to display the actual values of the various channels at the cursor point. The actual values are shown in the area immediately below the signal/file name in the pen control. To activate the data cursor, slowly move the windows cursor around on one of the data traces until the cursor changes from an arrow to a hand. When the hand cursor appears, click the left mouse button and the cursor will be shown at that location on the graph. The actual values for all channels loaded will be shown in the pen control area associated with each channel.

Note that when attempting to use the data cursor, the windows cursor will only change from an arrow to the hand when on a data point for one of the channels. If you are viewing a zoomed portion of the graph, the DISPLAY DATA POINTS option may have to be enabled to allow identification of the individual data points.

7.6 GRAPH ZOOMING

To zoom in on an area of a graph, move the windows cursor to one corner of the area that is to be enlarged. Press and hold down the left mouse button. As you move the windows cursor, observe a rectangle to be drawn, one corner being the point at which the left mouse button was pressed and the opposite side being the present windows cursor location. A magnifying glass symbol will be displayed as the windows cursor during the zoom window definition. There is a minimum size of zoom window allowed and the windows cursor will show the "NO/NOT" symbol when the zoom window is less than the minimum allowable size. A magnifying glass icon will appear when the minimum size is reached. The zoom window will fill the entire graph area once the left mouse button is released. The zoom function may be repeated on a graph that has already been zoomed to further increase the magnification effect.

Figure 7-7 shows the effect of zooming in on the chart shown in Figure 7-5.

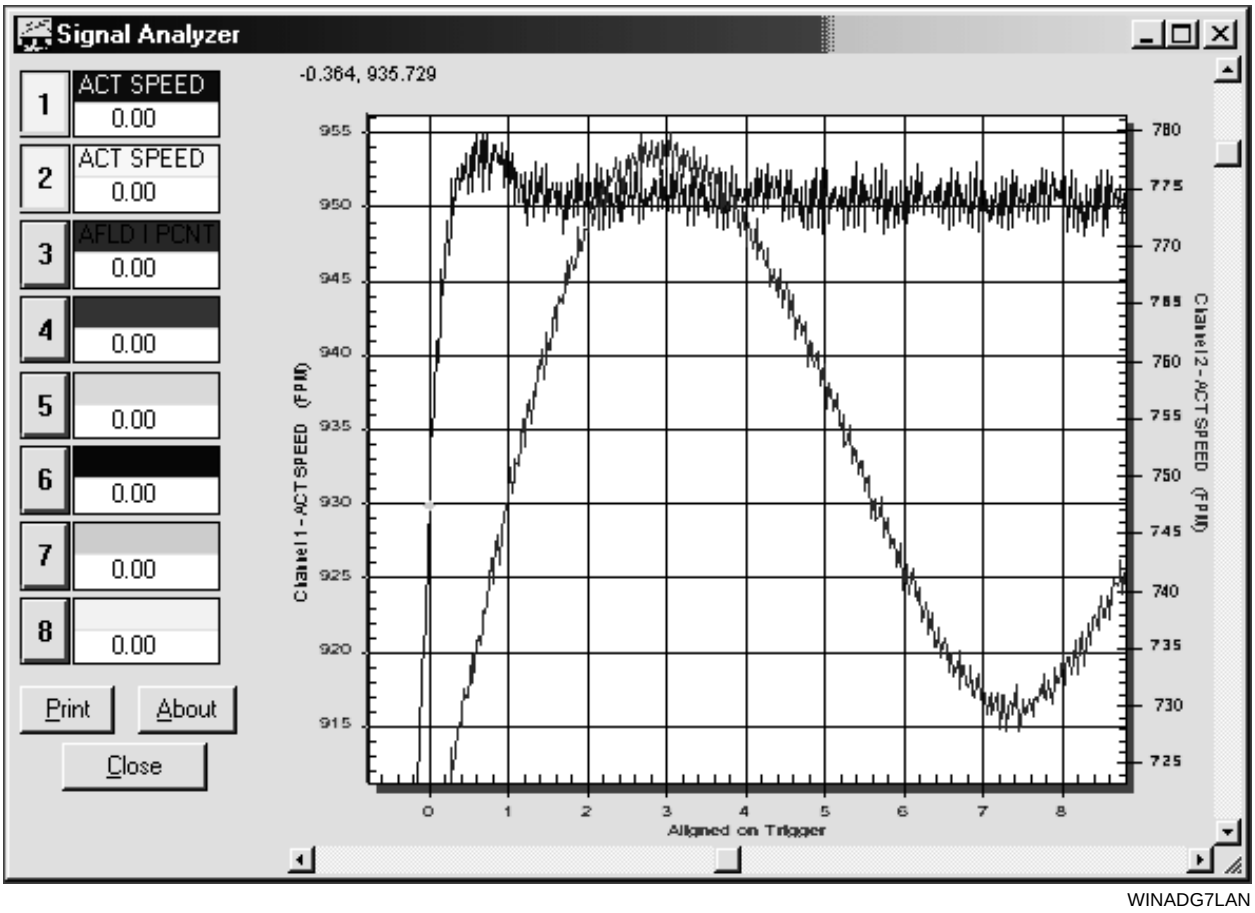


Figure 7-7. Screen With Zoom Feature In Use

After having zoomed an area of the graph, horizontal and vertical scroll bars will appear below and to the right of the graph. The scroll bar below the graph will allow panning of the zoom window on the X (time) axis. The vertical scroll bar to the right of the graph will allow panning of the zoom window on the Y axis.

To return to the original graph display, click the right mouse button with the windows cursor on the graph. The context menu shown in Figure 7-8 will appear.

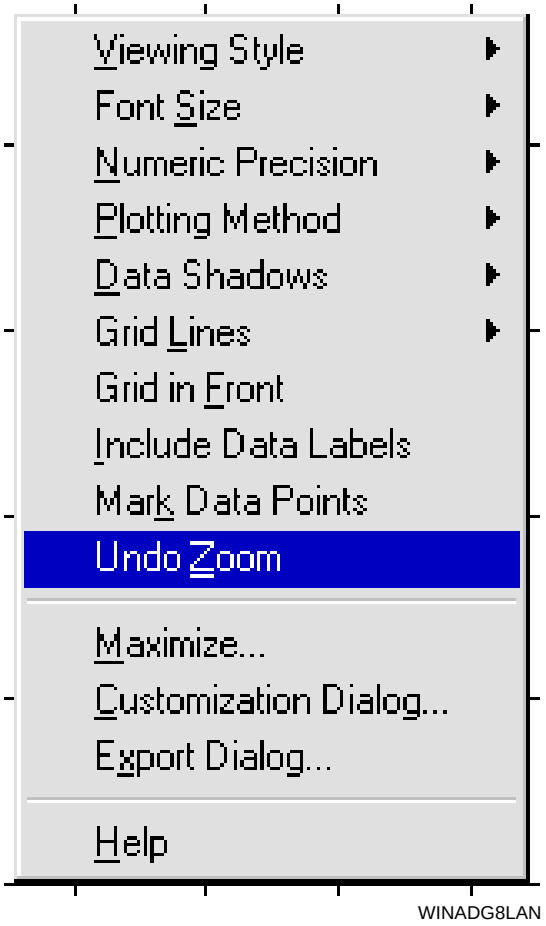


Figure 7-8. Context Menu

Select UNDO ZOOM to return to original zoom.

7.7 MANUAL CONTROL OF Y AXIS SCALES

When a channel is initially displayed, the Y axis scaling is selected to provide an optimal view of all data contained in the trace. The Y axis scaling can be manually set by the user to allow the data to be scaled or offset as required. To manually scale a channel, right click on the pen control. Select the SET MANUAL SCALE option. A window will then open with places to enter the minimum and maximum Y axis scaling as shown below. Once set, the manual scaling will remain in effect.

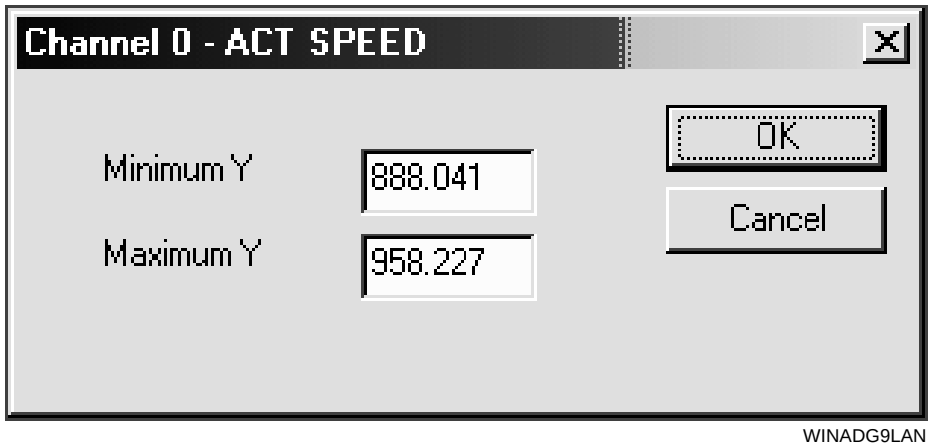
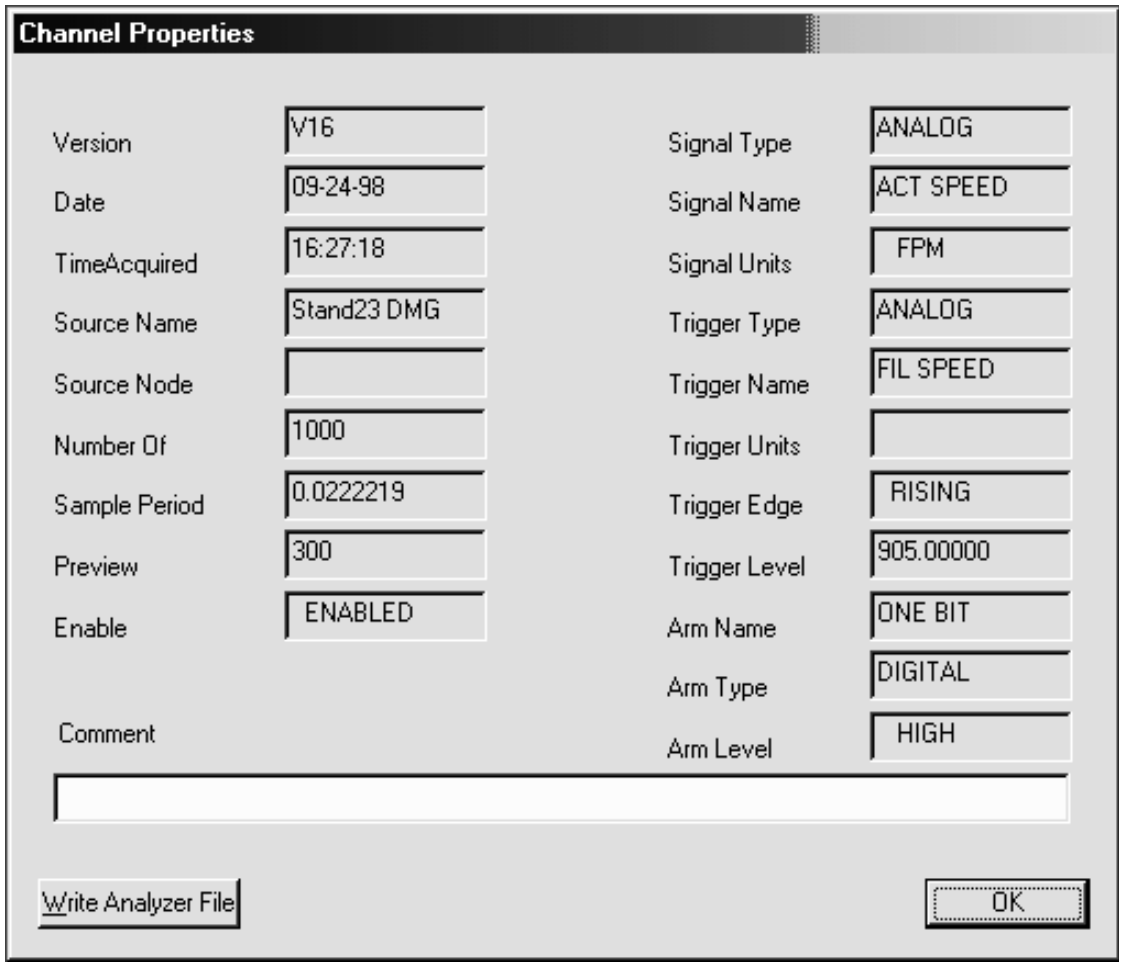


Figure 7-9. Adjusting Y-Axis Range

7.8 VIEWING CHANNEL PROPERTIES

After an analyzer data file has been loaded into a channel, the properties of the file may be viewed by right clicking on the channel pen control and then selecting PROPERTIES. The following window will be displayed.

In addition to the various parameters associated with the data collection, there is a comment section that allows the user to view and alter comments associated with the analyzer data file. If comments are added or altered, the changes may be saved to the analyzer file by clicking the WRITE ANALYZER FILE button.

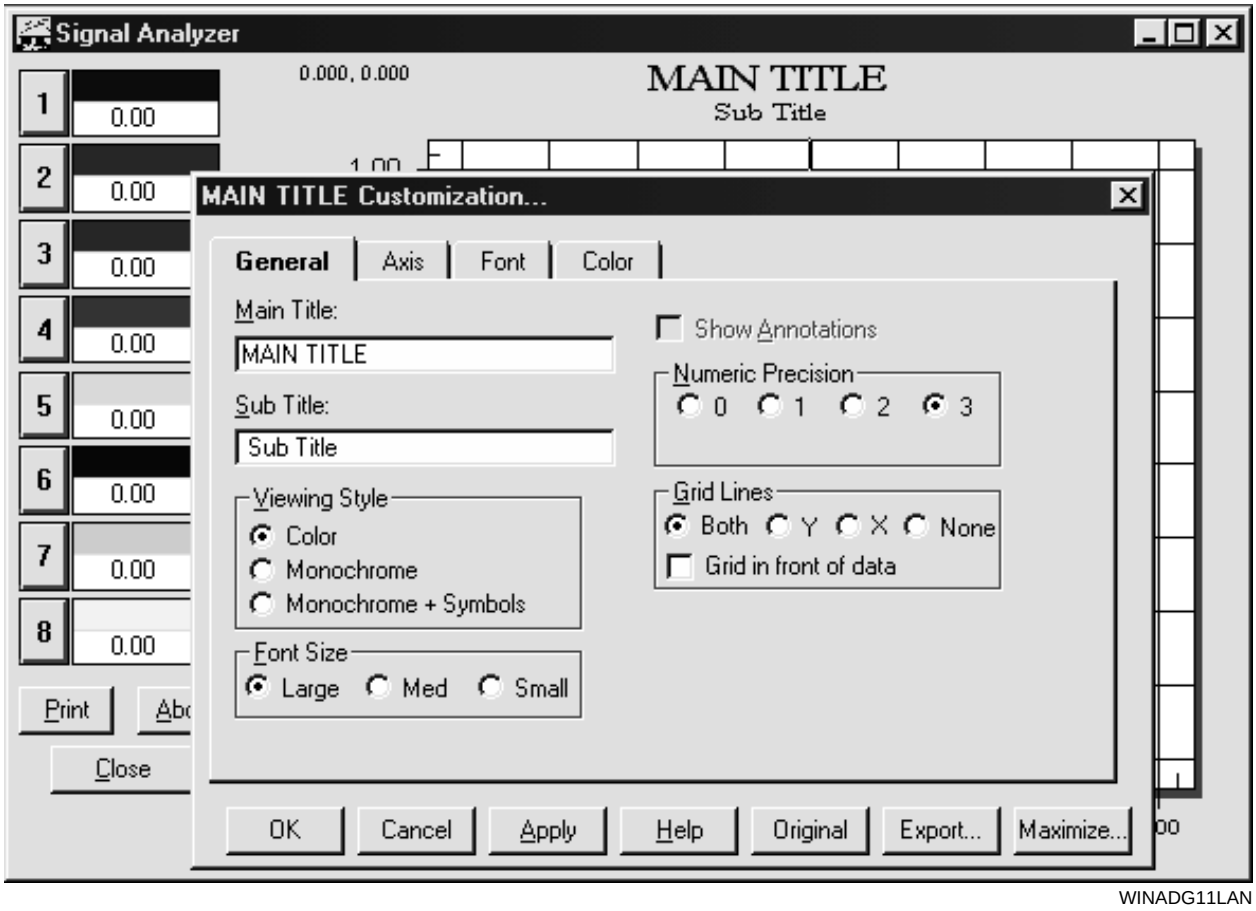


WINADG10LAN

Figure 7-10. Channel Properties Screen

7.9 ADDING TITLES TO THE GRAPH

With the windows cursor on the graph, double left click. A CUSTOMIZATION window will appear (see Figure 7-11). The GENERAL tab of the CUSTOMIZATION window has fields to allow entry of Graph title and graph subtitle.



WINADG11LAN

Figure 7-11. Adding Titles to Graph

7.10 MAXIMIZING THE GRAPH VIEW

To enlarge the graph area to the maximum extent possible, left double mouse click on the graph area. Click on the MAXIMIZE button. When the CUSTOMIZATION window (Figure 7-11) opens, the graph will expand to occupy the entire screen area as shown in Figure 7-12. To return to the normal graph display, either press the escape key or left mouse click on the menu bar at the top of the window. A similar enlarging effect can be accomplished by double clicking on the title bar of the normal size graph.

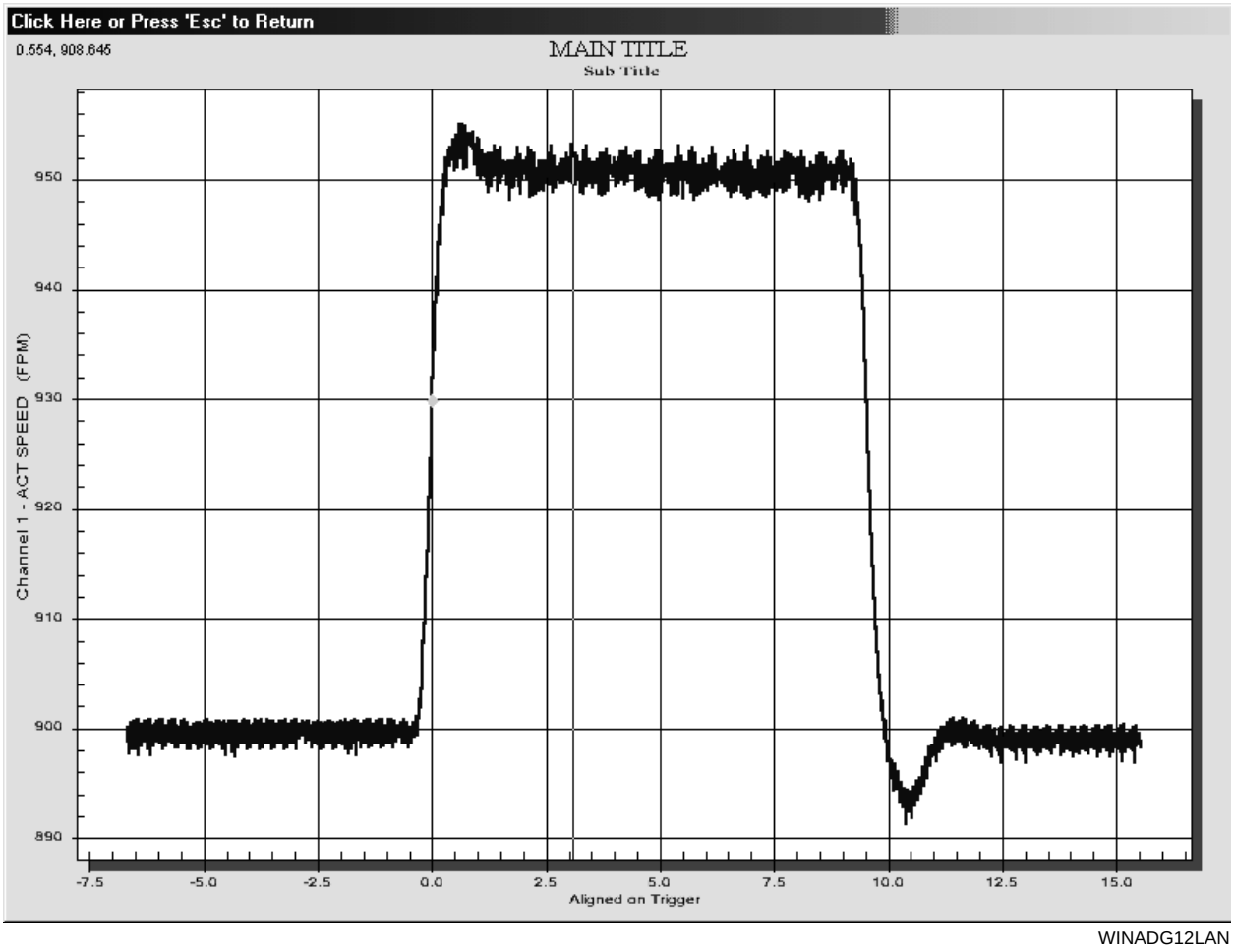


Figure 7-12. Full-Screen Graph View

7.11 GRAPH PRINTING

To print a graph, press the PRINT button found below the pen controls. The following window (Figure 7-13) will appear:

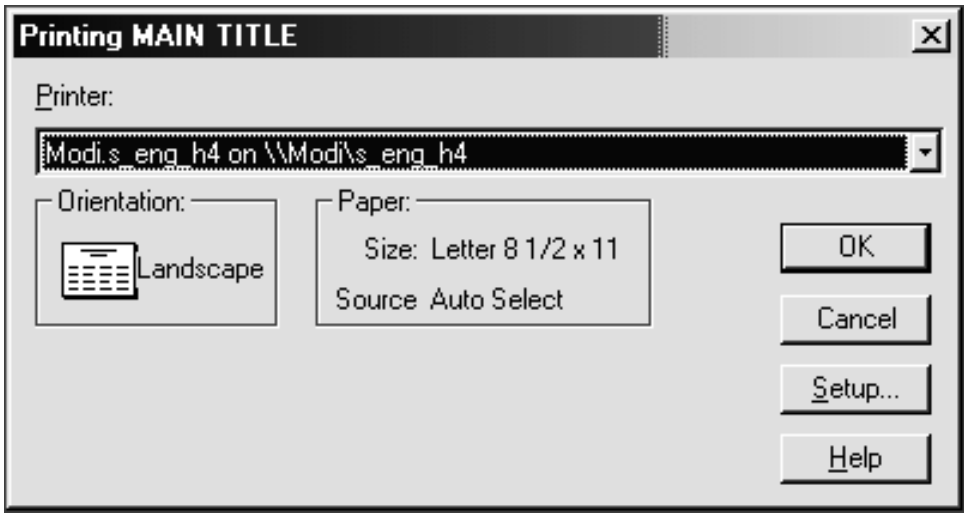


Figure 7-13. Printing Dialog Box

The window allows selection and setup of the printer. After printer selection and possible changes to the setup, clicking the OK button will cause the graph to be printed.

7.12 ADDITIONAL KEYSTROKE CONTROL

KEY STROKE	RESULT
SPACEBAR	Shows the customization dialog
Q	Shows a popup menu
S	Switches between monochrome and color viewing styles
T	Toggles between custom and original parameters
X	Shows the export dialog
M	Maximizes the object to fit the screen
P	Shows the print dialog
D	Shows the Text/Data export dialog
ARROWS	Scrolls both vertical and horizontal scrollbars by one line
PG-UP/PG-DOWN	Pages vertical scrollbar
SHIFT+PG-UP	Pages horizontal scrollbar to the right
SHIFT+PG-DOWN	Pages horizontal scrollbar to the left
HOME	Moves vertical scrollbar to its first position
END	Moves vertical scrollbar to its last position
SHIFT+HOME	Moves horizontal scrollbar to its left-most position
SHIFT+END	Moves horizontal scrollbar to its right-most position

SECTION VIII

REAL TIME DATA

8.1 INTRODUCTION

The ADDAPT program allows real time viewing and editing of user defined data in a tabular format through the use of the REAL TIME DATA COLLECTION tool. This tool includes elements of both the analog and digital tables.

8.2 REAL TIME DATA

Selecting TOOLS-REAL TIME DATA COLLECTION will open the ADDAPT 98 Real Time window shown in Figure 8-1. The flashing ICON in the upper left corner of the window will flash green when communication to the drive(s) is successful and will flash red if there are communication problems.

Three columns on the left side of the window and three more on the right contain the LABEL, VALUE, and UNITS for numeric (analog) parameters. A grayed out VALUE for a row indicates that that row is not configured. When the row is configured, the LABEL column will contain the label of the parameter being viewed, unless the screen is set to Offline and the field is set to read labels up from drive. Also, the label may not match the analog or digital parameter being viewed if user has manually entered his own labels in the field setup. The VALUE column will contain the actual value being periodically read from the drive. The UNITS column will contain the units of the parameter being viewed. When configured, the VALUE will show the text on a white background. The VALUE background will turn yellow in the event there is a communication error that results in that value not being refreshed.

The eight buttons at the bottom of the screen are for digital bits from the drive digital table. When the button is grayed out, it indicates that the button is not configured. When the button is configured, the button will have a legend that is the digital bit label, unless the screen is set to Offline and the field is set to read labels up from drive. Also, the label may not match the analog or digital parameter being viewed if user has manually entered his own labels in the field setup. The color of the button will be determined by the state of the digital bit in the drive. RED will indicate the bit is off/ZERO BIT. GREEN will indicate the bit is on/ONE BIT. The button will be yellow in the event there is a communication error that results in the state of the bit not being refreshed.

Near the top of the screen is a box where text may be placed to provide a screen name or other information. Right click on the box. The Real Time Screen Text box appears. Enter or edit the desired text and check Accept.

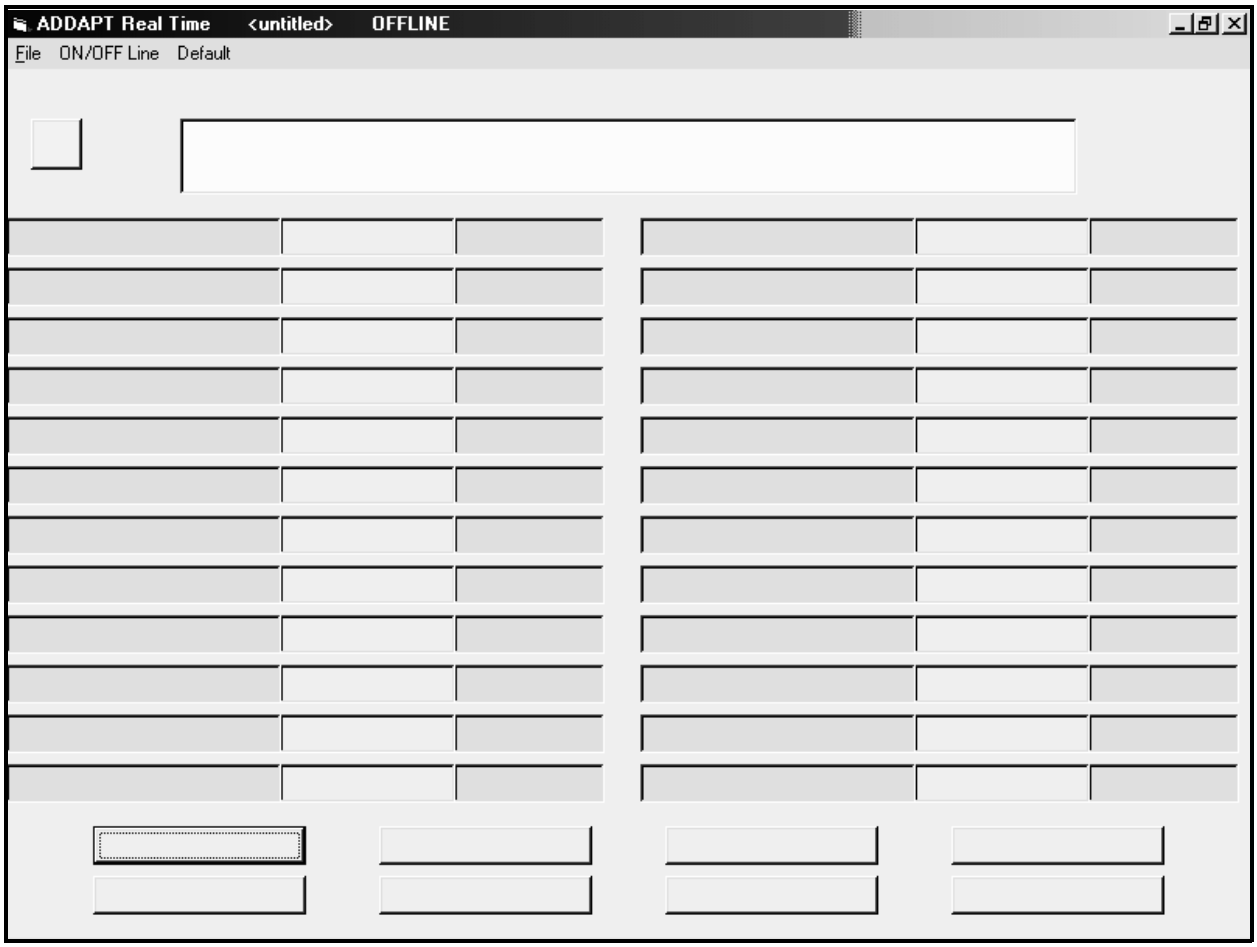


Figure 8-1. Basic Screen, Real Time Data

The pull-down menu bar on the Real-Time Data screen contains **File** with the usual selections, **ON/OFF Line** (shown selected in Figure 8-2) used to enable and disable communication to drives, and **Default**, which is used to define the default COM CHANNEL and DRIVE ID for analog and digital data point configuration (Figure 8-3). Each data point may be separately configured for any COM CHANNEL and DRIVE ID if desired.

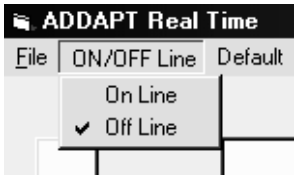


Figure 8-2. Real Time Menu Bar

Figure 8-3. Default Com Parameters Screen

8.3 ANALOG CONFIGURATION

To configure an analog section of the Real Time window, right click the center column (left or right side) of that row. The window shown in Figure 8-4 will open. The rest of this Analog Configuration section will refer to Figure 8-4. The user may also reference the Maintenance Grid (Figure 4-5) in edit mode to determine the element (parameter) number for the desired parameter.

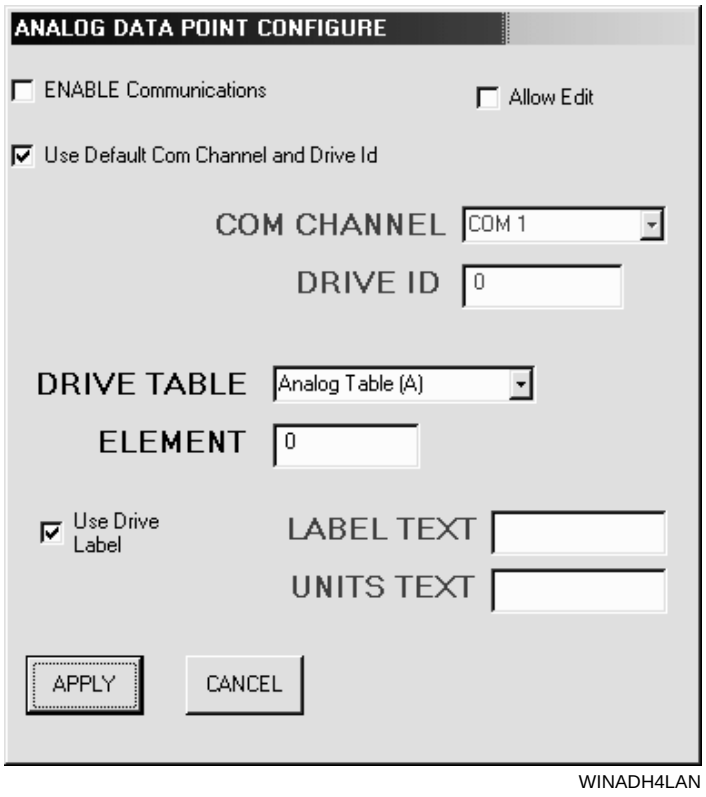


Figure 8-4. Analog Configuration Screen

If you want the parameter being configured to be shown on the Real Time window, then check the ENABLE communications box.

To configure a row, first the COM CHANNEL must be selected (unless the "Use Default Com Channel and Drive ID" box, described in the following paragraph, is checked). By clicking the down arrow on the right side of the COM CHANNEL entry, a menu will open listing the communication channel options (see Figure 8-5).

In most cases, the "Use Default Com Channel and Drive ID" box should be selected. This will set all data fields according to the default that was initially set by the user. Selecting Default from the pull-down menu bar brings up the Default Communication Parameters screen (Figure 8-3) where the COM CHANNEL and DRIVE ID may be set.

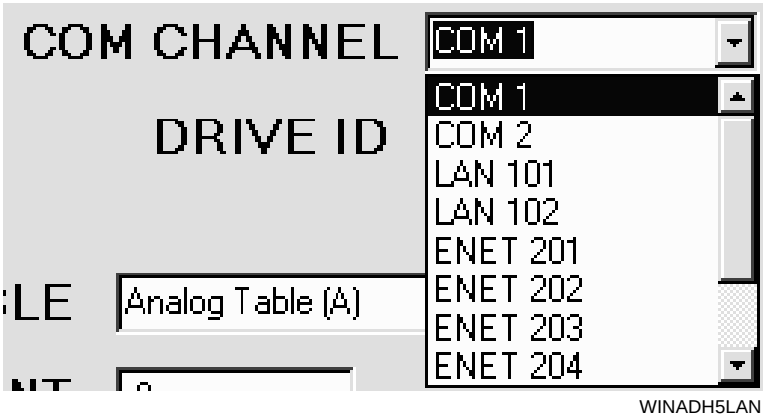


Figure 8-5. Com Channel Options

The several COM selections correspond to the several possible COM CHANNELS that were defined during the setup of the ADDAPT program under TOOLS-OPTIONS-SERIAL SETTINGS. The LAN 101 and LAN 102 entries correspond to the two possible settings defined under TOOLS-OPTIONS-TOKEN BUS SETTINGS. A valid COM CHANNEL selection must be made, one that is defined and enabled.

Enter the correct Drive ID in the range of 0-254. (This is not required if the "Use Default Com Channel and Drive ID" box is selected.)

Next select the DRIVE TABLE by clicking the down arrow at the right of the DRIVE TABLE field and observing the pull down menu (see Figure 8-6).

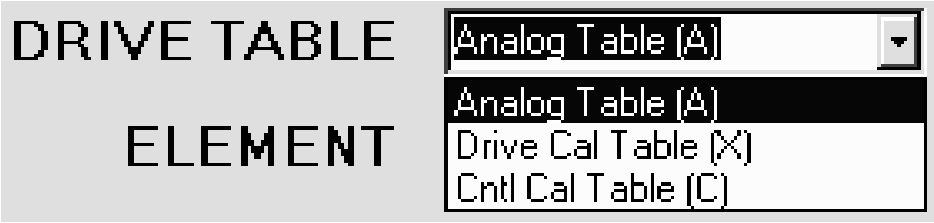


Figure 8-6. Data Table Options

The menu will offer three options: Analog Table (A), Drive Cal Table (X), or Cntl Cal Table (C). The options allow for display and possible editing of analog data from the ADD32 Analog table (Axxx parameters), ADD32 Drive Calibration table (Xxxx parameters), or the ADD32 Control Calibration table (Cxxx table) respectively.

The TABLE ELEMENT entry defines the element (parameter) number of the selected data table that is to be displayed and possibly edited.

If it is desired that the selected parameter be editable from the Real Time window, then check the ALLOW EDIT box.

The boxes marked LABEL TEXT and UNITS TEXT are where those labels can be manually entered, if not uploading the text online from an ADD32 drive. "Use Drive Label" should not be checked (selected) to use these boxes. "Use Drive Label" should only be checked if you want to upload the text from the drive.

Press the APPLY button to return to the Real Time window.

Upon return to the Real Time window, if the screen has been configured and "On Line" has been selected from the ON/OFF Line pull-down menu, the LABEL and UNITS fields on the Real Time window will be filled with data read from the defined ADD32 drive. If communication to the drive is not successful, then the LABEL and UNITS fields will not be filled, the VALUE field will remain empty, and the VALUE field backround will be yellowed. The LABEL and UNITS fields will be correctly filled upon successful communications to the drive.

8.4 DIGITAL CONFIGURATION

To configure a digital section of the Real Time window, right click on the desired button at the bottom of the screen. The window shown in Figure 8-7 will open.

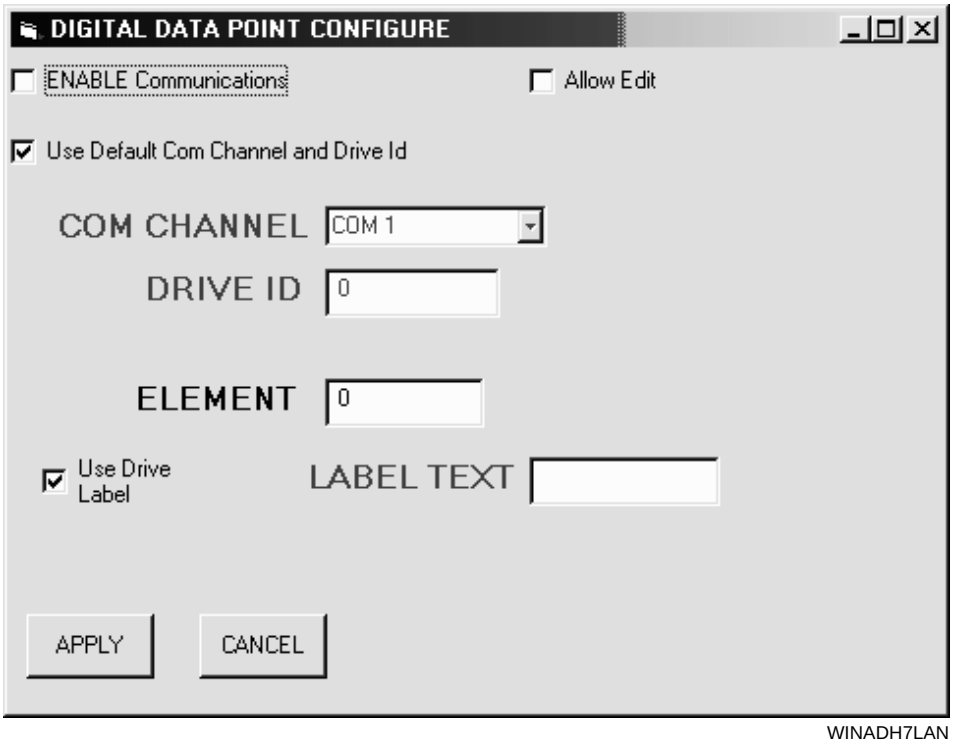


Figure 8-7. Digital Configuration Screen

If you want the parameter to be shown on the Real Time window, then check the ENABLE Communications box.

To configure a button, first the COM CHANNEL must be selected (unless the "Use Default Com Channel and Drive ID" box, described in the following paragraph, is checked). By clicking the down arrow on the right side of the COM CHANNEL entry, a menu will open listing the communication channel options, as previously explained for the analog configuration.

In most cases, the "Use Default Com Channel and Drive ID" box should be selected. This will set all data fields according to the default that was initially set by the user. Selecting Default brings up the Default Communication Parameters screen where the COM CHANNEL and DRIVE ID may be set.

Next, the correct drive ID must be entered. (This is not required if the "Use Default Com Channel and Drive ID" box is selected.)

The TABLE ELEMENT entry defines the bit number in the ADD32 digital table that is to be viewed and possibly edited. A TABLE ELEMENT entry of 12 would correspond to bit 12 (D012) in the digital table. Reference the ADD-32 manual (Appendix C) for the desired element (parameter) number.

The Allow Edit box must be checked if it is required that the user be able to alter the state of the bit from the Real Time window.

The box marked LABEL TEXT is where the text can be manually entered, if not uploading the text online from an ADD32 drive. "Use Drive Label" should not be checked (selected) to use the LABEL TEXT box. "Use Drive Label" should only be checked if you want to upload the text from the drive.

Press the APPLY button to return to the Real Time window.

Upon return to the Real Time window, if the screen has been configured and "On Line" has been selected from the ON/OFF Line pull-down menu, the digital button legends on the Real Time window will be filled with data read from the defined ADD32 drive. If communication to the drive is not successful, then the legend will not be filled and the button color will be yellow. The legend will be correctly filled upon successful communications to the drive.

8.5 EDITING in the Real Time Window

Editing of an analog parameter shown in the Real Time window (and configured to be editable) may be acomplished by left mouse clicking on the VALUE field of the parameter. The following edit box will open (Figure 8-8).

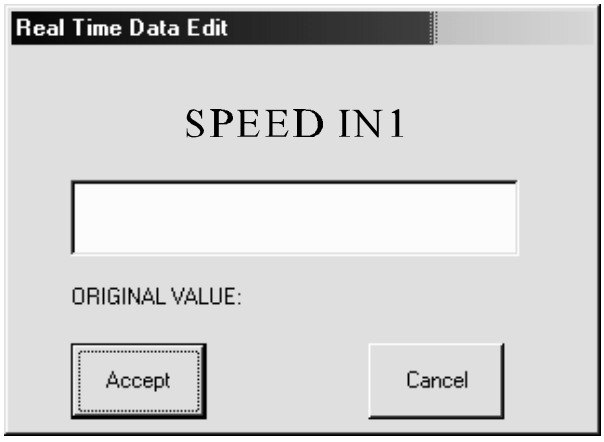


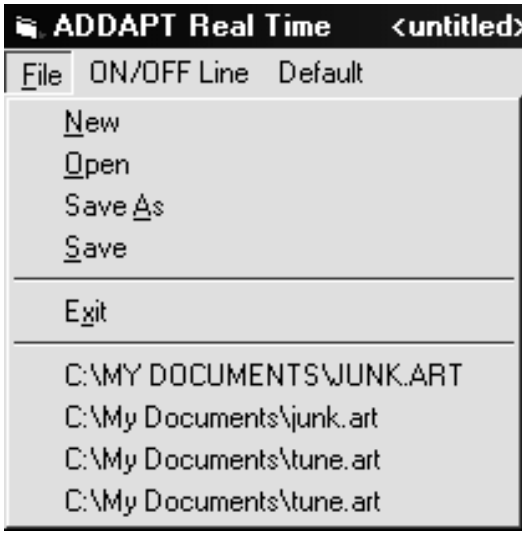
Figure 8-8. Real Time Edit

The label of the parameter being edited appears near the top of the edit box. The present value of the parameter is shown in the edit field. To change the value, simply enter the new value. To make the change to the parameter, press the ACCEPT button. To exit without altering the parameter, press the CANCEL button.

To edit (toggle) a digital parameter, simply left mouse click on the button for that point. If the point is defined to be editable (enable toggle), then the program will send the bit change to the ADD32. The color of the button will reflect the new state of the bit on the next update of the button.

8.6 SAVING and RESTORING Real Time windows

A Real Time window configuration may be saved by using the FILE menu, shown in Figure 8-9.



WINADH9LAN

Figure 8-9. File Menu Selections

To save the configuration, select SAVE AS. The following window (Figure 8-10) will then appear:

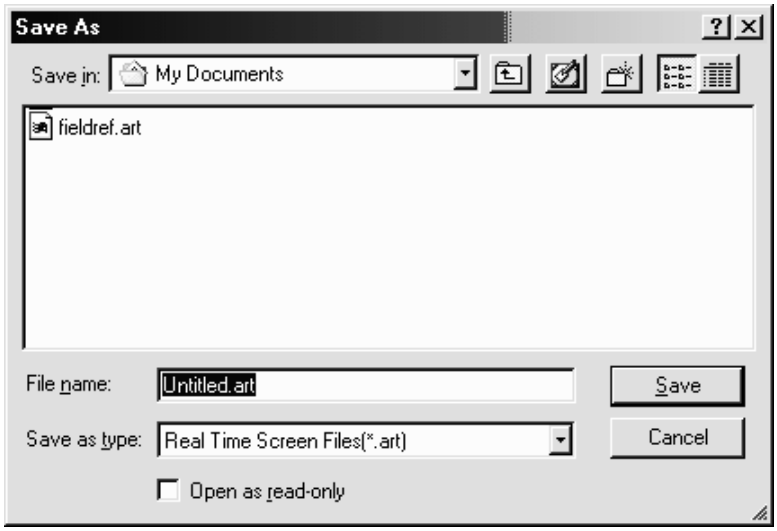


Figure 8-10. Save As Dialog Box

Change the file name from UNTITLED.ART to the desired file name. The files will be saved with a .ART (ADDAPT REAL TIME) extension and will be saved to the Realtime Screen's folder as defined in Tools\Options menu. After saving the file, note that the file name is now displayed as part of the title at the top of the Real Time window.

The FILE-SAVE selection may be used once a configuration has been previously loaded or saved.

To run a Realtime Screen, select FILE from the Real Time window. Select the OPEN option and it will show a list of saved screen files in the default Realtime Screen folder defined in Tools\Options menu (Figure 8-9). Select the desired file and then click on the Open button.

APPENDIX A

INSTALLATION AND FAST START

A.1 GENERAL

This appendix contains basic information to get ADDAPT installed and running as quickly as possible. It describes the installation procedure for ADDAPT 98 supplied on CD ROM (P/N 682110). This version of ADDAPT should be installed on a Windows 98 system. See paragraph 1.5 for complete platform requirements. If the installation process cannot complete successfully, contact the Avtron Field Service Department at (216)-642-1230.

Prior to starting the installation procedure, make sure that no other applications are running.

A.2 ADDAPT 98 INSTALLATION: CD ROM (P/N 682110)

1) Use the Windows Control Panel utilities to uninstall all present ADDAPT programs from the computer.

2) Insert the CD ROM into the computer. Do not execute any programs.

3) Execute the MDAC_TYP.EXE program found on the CD ROM. This can be done from Windows Explorer. Reboot the computer only if prompted to do so. Otherwise proceed to the next step.

4) Execute the SETUP.EXE program found on the CD ROM. Reboot the computer only if prompted to do so. Otherwise proceed to the next step.

5) The ADDAPT program requires Template files for the ADD-32 software part numbers and version numbers you intend to use it with. Copy your ADD-32 DOS Template files required to the DOSTEMPLATE subdirectory of the ADDAPT directory. At this time also copy any DOS ADD-32 Cal/Config files you have into the DOSTEMPLATE directory. If available, copy the ADDAPT windows template file(s) to the TEMPLATE subdirectory of the ADDAPT directory.

NOTE

The standard ADDAPT 98 installation location for the ADDAPT directory is C:\Program Files\Avtron Manufacturing\ADDAPT.

6) Remove the CD from the computer.

A.3 STARTING ADDAPT 98

1) Launch ADDAPT 98 by clicking START/PROGRAMS/ADDAPT. You will need a product code from Avtron to enable the ADDAPT features you purchased. Go to the SECURITY-> PRODUCT CODE menu. Note the displayed Key Code and call Avtron Field Service at 216-642-1230 ext 1214 M-F 8-5 EST to get a product code.

2) It is necessary to convert your old Template files for use in ADDAPT 98. Go to FILE->DOS CONVERSION UTILITY. Select any template file from each software part number and version number you need to convert. Note there is a group of template files associated with each software part number and version number. Follow the prompts to accomplish the conversion. The program will convert all template files for the part number and version number selected at once even though you select only one (any one) template file in that group.

3) If you are going to operate On Line, proceed to step 4. If you must operate off line and cannot go on line to perform the ADDAPT 98 configuration, you will need to manually configure your ADDAPT for the ADD-32 drives in your system. Go to FILE->NEW-> to create a configuration file. Name the file and use the Drive Personality window that pops up to enter section name, software part number, version, and address (Drive Com ID) for each drive. You will also need the drive channel (usually Channel 1 for serial link). This data must match the actual drive configuration for your application.

4) Go to the TOOLS->OPTIONS menu. If using a serial link to communicate to the drives, then select the SERIAL SETTINGS tab. Enable the appropriate COM channel based on the hardware configuration of your computer. Set the baud rates to match the rates programmed into the drives. Refer to the ADDAPT manual for a more detailed explanation of the SERIAL COMMUNICATIONS settings. If communicating to the drives via the 802.4 LAN, a communications card (AVTRON P/N 630290) must be installed in the computer. Select LAN SETTINGS and a LAN ID based on the configuration of the communications card. A selection must also be made for a DMA and IRQ channel for the communications card. The DMA and IRQ channels selected MUST NOT BE USED BY OTHER DEVICES IN THE COMPUTER.

5) After setting the various communications options, exit and then restart the ADDAPT program.

6) Next, go to TOOLS->AUTO CONFIGURE. You can skip this if you have successfully performed a manual configuration. Enter a name for the configuration file, ensure that the UPPER ADDRESS LIMIT is set high enough to include all drives in your system, and then press the SAVE button. ADDAPT will poll for all drives in your system. This will take up to several minutes to complete. It will take longer if your upper address is set higher than necessary.

7) After the CONFIGURATION has been completed, use FILE->OPEN to open and examine the configuration file created. Ensure all drives are shown and that the part numbers and versions of the drives are as expected.

8) To edit drive calibration and configuration data, select TOOLS->ADDAPT MAINTENANCE. A list of all drives will be presented. Select the drive to edit; then select ON-LINE and observe the drive calibration/configuration data to be displayed.

9) To control the signal analyzer in a drive, select TOOLS->SIGNAL ANALYZER CONTROL. Select the drive you wish to control and then observe the analyzer control panel to be available.

10) To view the FAULT FIFO of a drive, select TOOLS->FAULT FIFO. Select the drive for which the FAULT FIFO is to be displayed. Then observe the drive FAULT FIFO shown by ADDAPT 98.

You have now performed several basic ADDAPT 98 functions. For a more detailed description of the various functions of the ADDAPT 98 program, please refer to the main body of this ADDAPT manual.

APPENDIX B

SECURITY SYSTEM

B.1 DESCRIPTION

A basic requirement of the ADDAPT package is to ensure that only appropriate personnel can alter parameters in the drive system or the ADDAPT package. With the protection of this layered security system, individuals are able to be assigned both a level of access and a password.

The security system includes four levels of users, shown in the following table from lowest to highest level.

Observer	Lowest Level
Operator	|
Maintenance	|
Engineer	Highest Level

These levels restrict access to particular functionality as described in paragraph B.4, ACCESS PRIVILEGES. Any user with an Engineer Level will have complete access to all system functionality.

Any one of the security levels can be set as the default level. That default level would automatically be in effect any time there is no user logged in, such as when powering up. The default is usually set to the lowest access level (Observer).

Being able to establish a different default level can be useful. For example, for a field service or application engineers' use, if the default level were temporarily set to Engineer, they would not be bothered by passwords and user names.

Only a user with an Engineer access level can change the default level.

B.2 INITIALIZATION

Initialization of the Security Manager makes it necessary to log into ADDAPT to use any functionality which is inaccessible due to the Default Security Level (unless a default level of Engineer is configured, which is unlikely). If the Security Manager is never initialized, full access if granted to all users. Additionally, erasing the password file creates an uninitialized Security Manager that allows complete access to any user. Initialization is begun by selecting the Security Manager command in the Security pull-down menu. The windows shown in Figure B-1 and then Figure B-2 will be displayed.

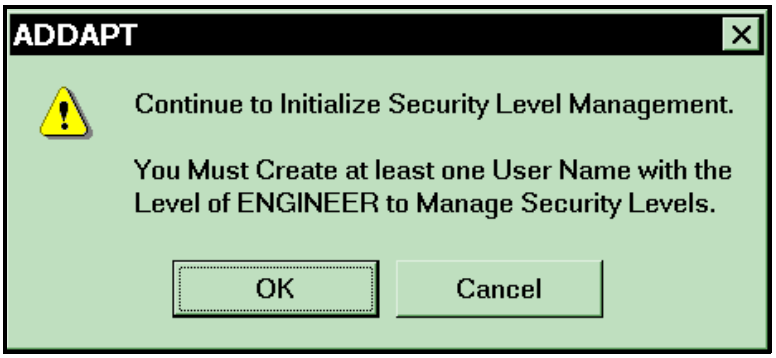
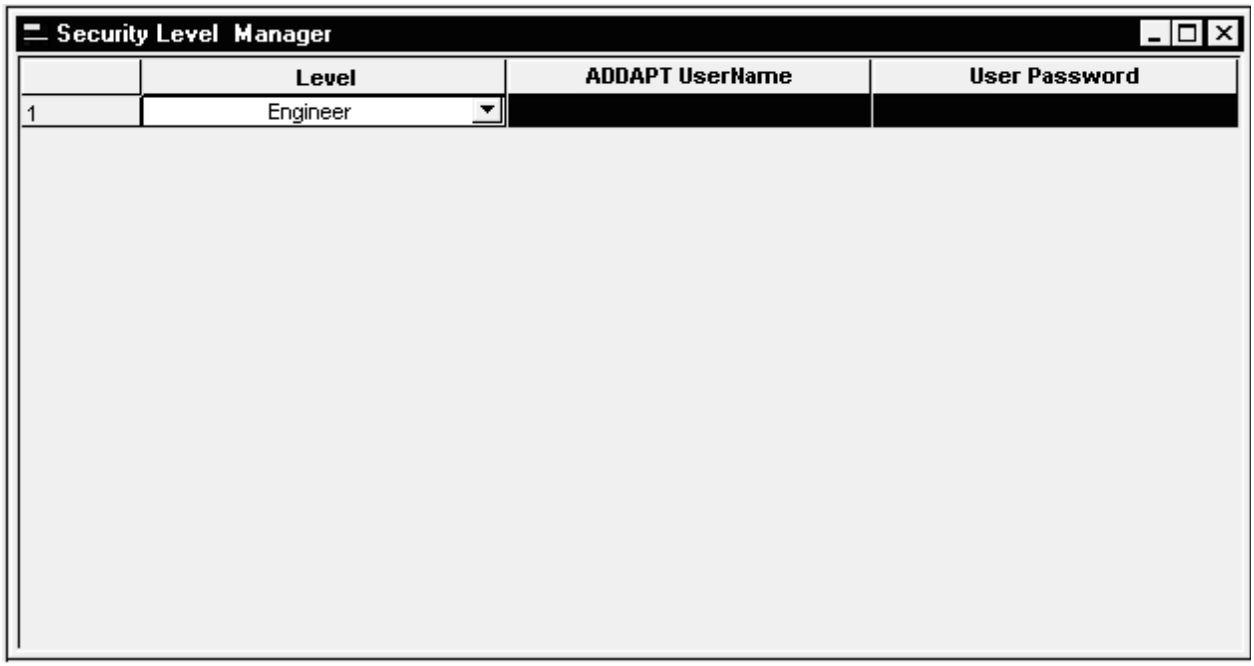

ADDAPT
Continue to Initialize Security Level Management.
You Must Create at least one User Name with the Level of ENGINEER to Manage Security Levels.
OK
Cancel
WINADY1LAN

Figure B-1. Security Manager Screen

Use of the Security Manager screen is straightforward. To the extent possible for the user's level (see above), he may select a user from the list and then edit his name, level, and password. Level is selected from a drop-down list. New users may be added to the list by entering data into the blank line at the bottom of the list. After entering the last data (the right-most cell), press the Enter key. ADDAPT will accept the new user information and provide a new blank line.

The Default User Level may be set by selecting Options in the Tools pull-down menu. The Parameters tab provides a drop-down list. See Figure 2-1. The selection will determine what features are available at start-up without logging on.



WINADY2LAN

Figure B-2. Security System Setup

When initializing the Security Manager, it is critical that at least one user has Engineer Level privileges. The Engineer Level is the only level that can create and delete users. Additionally, the Engineer Level is the only level that can create and edit another's password. Users may change their own passwords, however, using the Change Password screen shown in Figure 3-4. Usernames and passwords are not case sensitive.

The Default Security Level is contained in the Registry along with the last logged user. The Default Security Level can be set to any of the mentioned levels by any user with Engineer Level access. Understanding the Registry would allow the changing of the Default Security Level outside of ADDAPT.

The password file created stores encrypted passwords and user names, and each user's access level.

The password file is created with a backdoor user name and password, AVTRON and QRSV respectively. Neither of these is presented throughout the program to any user.

B.3 IMPLEMENTATION

After initialization, access to the Security Manager is restricted as follows:

The Maintenance Level will be able to establish security levels up to Maintenance for any user. This level will be presented with a read-only list of usernames, and passwords will be unavailable. The Operator Level will have read-only access to the Security Manager, and the Observer Level will be denied access.

NOTE THAT until the Security Manager is initialized, any user will have complete access (Engineer Level). During initialization of the Security Manager, there MUST be at least one user created with the security level of Engineer. A warning is presented anytime the Security Manager detects that there is not a user available with a level of Engineer.

There are no restrictions on the 48 maximum number of users and the administration of Security Levels, other than that there must be at least one Engineer Level.

A password and a username can contain from 1 to 15 characters. These characters must be of the set A through Z and 0 through 9.

The Login dialog box (Figure 3-1) is not presented during power up. The user must select ***Login*** from the Security pull-down menu to invoke the Login Dialog. Selecting Cancel at this dialog allows the user to continue at the Default Security Level.

If a user's Security Level is changed, that change will take effect when that user logs in. If the currently logged user's Security Level is changed, that change will not take effect until ADDAPT is restarted. When a user logs out, the access level goes back to the default level.

The status bar indicates the name of the current user and the level of access. If no one is logged in, it will indicate the default access level.

B.4 ACCESS PRIVILEGES

The following describes the access privileges ascribed to each security level:

B.4.1 Engineer:
Access to all system functionality.

B.4.2 Maintenance:
Access to all system functionality except the following:
- Cannot change Default User.
- Cannot change another user's password.
- Cannot access the Product Code Dialog.

B.4.3 Operator:

All the above Maintenance Level restrictions are in effect plus the following:

- All Configuration Files are restricted to read only.
- All Calibration Files are restricted to read only.
- Online editing.
- Saving Calibration Files.
- Accessing the Signal Analyzer Control.
- Clearing the Fault FIFO.
- Changing communications options.
- Uploads and downloads to a drive.
- Initiating an AutoConfigure.
- Accessing the Security Manager.
- Resetting a drive.

B.4.4 Observer:

All of the above restrictions are in effect plus the following:

- Cannot open a Calibration File.
- Cannot Convert DOS Template Files.

NOTE

Opening a Calibration File produces a Maintenance Grid.

Opening a Configuration File produces a Drive Personality Data Screen.

Warranty

Warranty and Duration

For a period of one year after installation, or fifteen (15) months from date of shipment from our plant, whichever is shorter, Avtron warrants the equipment, except as hereinafter provided, to be free from harmful defects in material and workmanship. Notwithstanding any other term or provision in this Warranty, the warranty provided herein shall terminate unless buyer notifies Avtron, in writing, of a breach hereof within the warranty period; any claims not made within such period are waived by Buyer. The warranty provided herein applies only if Buyer complies with all the other terms and provisions of this Warranty.

Uses of Equipment

The warranty provided herein applies only if the equipment has been used in a normal and proper manner under recommended conditions. Notwithstanding any advice or assistance given to the Buyer by Avtron or its suppliers concerning the equipment or its use, Avtron makes no express or implied warranties or representations, except as herein expressly provided, with respect to the equipment or its use, and Avtron shall not be liable in contract, warranty or tort (including, without limitation, for negligence or strict liability) as a result of such advice or assistance. In addition, unless otherwise agreed in writing signed by a duly authorized representative of Avtron, no equipment covered by this warranty is intended to be used in connection with any nuclear facility or activity, and if so used, Avtron disclaims any and all liability for any damage resulting therefrom.

Notification of Breach

When claiming a breach of this Warranty, Buyer must promptly (within 10 days from the date of the discovery of the defect) notify Avtron in writing.

Equipment Disposition

Upon notification of a claimed breach of this Warranty, Avtron, at its discretion, will either authorize the return of the defective equipment or part thereof (transportation costs to be prepaid by Buyer) or provide a suitable replacement or authorize the Buyer in writing to effect repairs at Avtron's expense. In the event that the equipment returned as authorized is found to be defective and Avtron elects to repair or replace said equipment, Avtron will pay the transportation costs associated with the return of said equipment to Buyer. Avtron shall not however be liable for any customs, tariffs, duties or taxes incurred in shipping equipment pursuant to this Warranty. These shall be the responsibility of the Buyer.

Option of Avtron to Repair or Replace Equipment or to Issue Credit
Avtron's sole obligation under this Warranty shall be, at the option of Avtron, to replace or repair any defective equipment or part thereof or to issue a credit with respect to the defective equipment equal to the purchase price thereof less depreciation.

Equipment Excluded From Warranty
The warranty provided herein does not cover typewriters strip printers, strip or chart recorders, card punch systems, or tape systems. The warranty provided to Avtron by the manufacturers of the foregoing equipment will, to the extent possible, be passed on to the Buyer. Avtron will, upon request of Buyer, make available for inspection the original manufacturer's warranty if Avtron has a copy thereof in its files. Due to the nature of the foregoing equipment, Avtron recommends that it be covered by a continuous service contract which is generally available from the original manufacturer at a reasonable cost. Electronic tubes, thyratrons, readout tubes and armature test fixtures are warranted for 90 days from date of installation. Other items or components may be excluded from the warranty provided herein if specifically excluded by purchase order or contract.

Resale or Lease of Equipment

In the event that the Buyer resells or leases equipment purchased from Avtron, the Buyer shall obtain the signed written agreement of the purchaser or lessee thereof that Avtron's only liability with respect to said equipment is as set forth in this Warranty. In the event that the Buyer fails to obtain such a signed written agreement, the Buyer agrees to indemnify Avtron against any claims, demands, judgments, suits, costs, liabilities and expenses (including reasonable attorney's fees) incurred by Avtron as a result of such failure.

Unauthorized Repairs

Unless otherwise agreed in writing signed by a duly authorized representative of Avtron, if the Buyer has repairs or modifications made to equipment covered by this Warranty by a person other than an authorized Avtron service representative, Avtron shall not be liable for any expenses incurred in connection therewith and the warranty provided herein shall automatically be terminated.

Governing Law; Saving Clause

This Warranty is part of the terms and conditions of the sale of the equipment covered hereunder and shall be governed by and enforced in accordance with the laws of the State of Ohio. Any provision hereof which is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such prohibition or unenforceability without invalidating the remaining provisions hereof or affecting the validity or enforceability of such provision in any other jurisdiction.

Limitation of Liability

IN NO EVENT SHALL AVTRON BE LIABLE IN CONTRACT, IN TORT OR OTHERWISE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUES, LOSS OF USE OF THE EQUIPMENT OR ANY DAMAGE TO ASSOCIATED EQUIPMENT, DAMAGE OR INJURY TO PERSONS OR PROPERTY, COST OF CAPITAL, COST OF SUBSTITUTE OR TEMPORARY EQUIPMENT, DOWNTIME OR CLAIMS OF CUSTOMERS) ARISING OUT OF OR AS A RESULT OF BREACH OF WARRANTY, DEFECT IN MATERIAL OR WORKMANSHIP OR ANY OTHER OBLIGATION OF AVTRON HEREUNDER.

Disclaimer of All Other Warranties

THIS WARRANTY COMPRISES AVTRON'S SOLE AND ENTIRE WARRANTY OBLIGATION TO BUYER, ITS CUSTOMERS AND ASSIGNS IN CONNECTION WITH EQUIPMENT SOLD, ASSIGNED, LEASED OR OTHERWISE DEALT WITH BY AVTRON. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS, ARE EXPRESSLY EXCLUDED.

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